Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Read in Largest Number of Plants

Vol. XXI March 11, 1931 No. 12

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Next Issue March 25, 1931

Published bi-weekly on Wednesday for producers and manufacturers of Sand, Gravel, Stone, Cement, Lime, Gypsum and other non-metallic minerals. Entered as second-class matter October 9, 1928, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

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Vol. XXI CHICAGO, MARCH 11, 1931 No. 12

Pipe-line Will Carry Slurry to Anchorage

UNIQUE CEMENT-PLANT PROJECT

First steps toward the construction of a new Portland-cement operation slated for the Pacific Coast were taken recently by the Alphonso Bell Corp. of Santa Monica, Cal., when an 8-in. pipe-line was laid through Santa Monica and out into the ocean.

The pipe-line is to run from the site of the cement-rock quarry in the Santa Monica mountains to a tanker anchorage supported by buoys about ½ mile out in the sea. It is proposed to quarry, crush and grind the rock in the mountains, mix the slurry and send it down the pipe-line to tankers at the anchorage. These tankers are to carry the wet mix to the proposed plant near Balboa, southward along the coast, where the kilns, finish-grinding and packing equipment will be located.

Alphonso Bell, promoter of the project, is a wealthy former real-estate operator in Los Angeles and vicinity. Residents of the exclusive Santa Monica residential district have been up in arms since the cement-quarrying project was first discussed about a year ago, objecting to the industrial character of the operations on the ground that it would be an undesirable addition to that territory. The Bell corporation finally obtained its permit, however, on the ground that actual operations in the mountains were far enough distant so as not to menace the rights of the property owners, while the pipe-line which is to carry the slurry is underground and of no cause for alarm.

Preliminary work on the project is being done under the direction of E. McLane Tate, chief engineer of the corporation.

Solons Get Bright Idea; Ask State Cement Plant

Following the suggestion made by Gov. W. P. Hunt in his message at the opening of the Arizona state legislature, a bill has been introduced before that body providing for the erection of a state cement plant.

The bill would place operation under control of the board of directors of state institutions, empower the board to call upon the University of Arizona and state teachers colleges for technical assistance, to acquire deposits of material by exercising the right of eminent domain when necessary, to locate mining claims and hold them until such time congress may grant them to Arizona, to close the plant when deemed proper to buy cement in the open market in carrying on of the state's contract cement business, and restrict the sale of cement for public use after the state plant is in operation. The measure also would place a tax on cement, and provide for its collection.

Pacific Coast Silica to Spend $150,000 on Plant

The Pacific Coast Silica Co., through S. D. Miller, vice-president, has announced plans for the erection of a new $150,000 silica-sand plant at Byron, Cal.

Acquires 60-Acre Stone Deposit; to Build Plant

The California Lime & Products Co., Lincoln, Cal., of which R. L. Hollingsworth is general manager, has purchased 60 acres of limestone deposits at Antelope, Cal., and has plans in progress for opening a stone quarry with crushing, loading, conveying and other machinery to cost about $125,000. Plans will also be drawn for a lime manufacturing plant and for a dry-ice manufacturing plant, as previously reported by PIT AND QUARRY. The installation will include a cableway, bunkering system, raw-material storage and distributing units and other structures. The entire project will cost over $700,000. Smith-Emery Co., 651 Howard St., San Francisco, is the engineer in charge of the project.

Merger of Two Mexican Cement Firms Effected

Consolidation of two Mexican cement producers — Cementos Portland Monterrey, S. A. and Cementos Hidalgo, S. A.—has been consummated, the merged concerns to be known in the future as Cementos Mexicanos, S. A.

The offices of the company are being maintained at Monterrey, N. L., Lorenzo H. Zambrano, formerly president of Cementos Portland Monterrey, heads the new consolidate.

Fresno Sulphur Plant Goes Into Operation

40,000 TONS ULTIMATE CAPACITY

The new $150,000 sulphur-processing plant of the Sunland Sulphur Co. at Fresno, Cal., started operating on February 14. The plant was designed particularly for the production of a finely-ground product for use in the vineyards and fruit farming areas of California. The plant will have an ultimate capacity of about 40,000 tons, but only a portion of this is to be used at present.

The plant consists of the mill proper, storage bunkers having a capacity of 20 carloads of raw materials, warehouse, boiler room and water plant. It is served by 1,400 feet of double spur track.

Heading the firm is T. L. Harper, president, while other officers are E. G. Brink, vice-president; B. H. Jones, secretary-treasurer, and J. H. Wright, superintendent and mill manager.

Raw sulphur is shipped to the plant in box cars, The sulphur is dumped direct to a crusher 15 feet below ground level and, after reduction, is elevated into a storage house holding 1,000 tons of the crude material. It is then taken by belt and screw conveyors to the mill proper where it is ground to such fineness that practically all of it will pass a 300-mesh sieve. Air separation is employed to insure proper gradation of the fines. The material is then thoroughly dried before being packed in bags.

Years of research and study of the results obtained by using sulphur in California has shown that, for reasons of increased covering power and for better and longer adherence qualities, the demand is constantly for finer and finer sulphur. To meet these requirements of successful users of sulphur, the most modern machinery obtainable has been installed in the Sunland Sulphur plant to produce a dusting sulphur that of which over 98 per cent passes the 300-mesh sieve, and yet which is dry and free flowing.

Standard Gypsum Co. to Build New Plaster Mill

The Standard Gypsum Co. of Canada, Ltd., has announced its intention to build a plaster mill at Vancouver at a cost of $100,000, to take the place of the present warehouse.

Oregon Concern Adds New Hoist Equipment

REPORTS GOOD 1930 BUSINESS

The Albany Sand & Gravel Co. of Albany, Ore., is erecting a small building adjacent to the main plant to house a new 100-hp. electric hoist recently added to the equipment. The new hoist will operate the drag-line to the plant.

Last summer new buckets were placed on the drag-line, doubling its former capacity. The company has, during the past year, made consistent improvements in the plant and added new railroad sidings, increasing its loading efficiency.

A new power crane with clam-shell bucket for loading and unloading, a new truck and other equipment was also put in service recently. The concrete-products plant operated in conjunction has also been expanded.

The company employs from six to ten men in its operations, providing an annual payroll of about $14,000. All of the property of the company is located within the city limits of Albany.

The company reports considerably more business for 1930 than for the previous year.

Indianapolis Plant Will Improve Storage System

A new raw-material stock-pile system will be placed into service for the coming season at the American Aggregates Corp. plant at Indianapolis, Ind. Construction of a 250-ft. reinforced concrete tunnel is now in progress. A belt conveyor installed in the tunnel will enable the raw materials stored above it during the night period of production to be reclaimed during the day period of process operation. The new improvement represents an investment of $15,000.

The Indianapolis plant of the American Aggregates Corp. is busily engaged in the furnishing of 1,000,000 cu. yd. of sand for a nearby railroad project.

Dry-Ice Sales in 1930 Up Nearly 90 Per Cent

Sales of the Dry-Ice Corp. of America for the first ten months of 1930 were more than $2,000,000 as compared with $1,300,000 in 1929. Profit for the year before depreciation and development expense, amounted to approximately $350,000.

In a letter to shareholders of Dry-Ice Holding Corp., President Robert B. Rust says in part:

"Dry-Ice Corp. of America has made gratifying progress during 1930, although the industries consuming 'Dry-Ice' have not escaped the general business depression. Sales for the first ten months of 1930 exceeded $2,000,000 contrasted with total sales during 1929 of approximately $1,300,000.

"Two large new plants (Peoria and Los Angeles) were erected and placed in operation during 1930. At present wholly-owned plants and regenerators have a daily capacity of 270 tons. These large plants are located at strategic points from which the national demand can be economically supplied.

"As a result of the work done over several previous years, there was constructed during the spring of 1930 the latest design of 'Dry-Ice' refrigerator car. This car since that time has been continuously subjected to a series of diversified commercial tests with such loadings as beef, pork, eggs, frozen fish, frozen fruits and ice cream. The tests have been wholly satisfactory and most encouraging.

"The gain in number of 'Dry-Ice' trucks, operating throughout the United States, of approximately 150 per cent during the past year speaks for itself.

"It is our confident expectation that 1931 will bring greater success to the company."

Michigan Sand Producer Buys Additional Deposit

Scarlett & Earl, Inc., Lansing, Mich., sand-and-gravel producer, whose plant was described and illustrated in the Jan. 28, 1931, issue of PIT AND QUARRY have recently purchased additional deposits owned by the Plymouth Congregational Church of Lansing. The site had been used as a summer camp by the church previously.

Resumes Activities at Rogers City Operations

The Rogers City, Mich., quarries and crushed-stone plants of the Michigan Limestone & Chemical Co. have resumed work with about 500 men employed. Stripping operations are being pushed at this time, preparatory to full-capacity operation by the opening of the Great Lakes navigation season.

New Distributing Plant to Be Built by Pioneer

The Pioneer Sand & Gravel Co., Seattle, Wash., has awarded the general contract to General Construction Co., Seattle, for its new distributing plant equipment, including a conveyor tower platform, crane platform and mechanical-handling facilities, to cost about $50,000.

Dallas Producer Takes Over Another Operation

The Clem Gravel Co. of Dallas, Tex., has been absorbed by the American Gravel Co., also of Dallas. No operating personnel changes of importance have been made and the plant is continuing operation as formerly under its new owner.

Sewell Lime Company Will Build New Kilns

IDAHO FIRM REELECTS OFFICERS

Stockholders of the Sewell Lime Co. of Orofino, Ida., reelected officers at the second annual meeting held recently. Those include: Dr. H. D. Britan, president; E. U. Falen, vice-president; J. M. Molloy, secretary-treasurer; Byron Sewell, assistant secretary-treasurer; C. O. Portfors, F. A. Jones and Theo. Blake, members of the board of directors.

The company was reported to be in good condition and many accomplishments were cited for the first year's operations, which thus far have been largely in the way of development. According to the report, all necessary development work has been completed and the company is now ready to install the first of three lime kilns. Work on the first kiln will start as soon as weather conditions permit and the other two will follow later on in the year.

The three kilns will have a daily capacity of from 45 to 60 tons of burned lime and the entire output has already been contracted for by one company on the Pacific Coast, it is said.

Georgia Kaolin Co. Asks Capitalization Increase

The Georgia Kaolin Co. of Dry Branch, Ga., has filed a petition in the Bibb County superior court for permission to increase its capitalization from $500,000 to $1,000,000.

Officers of the company are: E. J. Grassman, of Elizabeth, N. J., president; E. Y. Mallary, of Macon, vice-president and general manager; R. W. Howell, of New York City, vice-president; E. W. Newcomb, of Elizabeth, N. J., treasurer; John B. Harris, of Macon, secretary, and D. Fort McCormick, assistant secretary and assistant treasurer.

Lehigh to Resume Work at New Castle Plants

The Lehigh Portland Cement Co. is shortly to resume production at its New Castle, Pa., plants. Extensive improvements, including the installation of new machinery, are under way and will be continued throughout the spring.

Retailing Unit Acquired by California Producer

Graham Bros., Inc., aggregate producers at Los Angeles and Long Beach, Cal., has acquired control of the George M. La Shell Corp., dealers in building materials, according to Paul C. Graham, vice-president.

The W. M. Dean Marble Co., of Columbia, Tenn., has taken over the Dorsey & Nelson Marble Co. of that city.

Huge Concrete Order for Tennessee Plant

BUSY ON 40,000-CU. YD. AWARD

Ready-mixed concrete from the plant of the Ready Mixed Concrete Co., Knoxville, Tenn., is being used on various types of building and construction work in that city and territory within a radius of 15 miles. The firm recently received a contract for furnishing concrete for the $900,000 Henley Street bridge under construction over the Tennessee River at Knoxville, a reinforced-concrete-arch structure, involving the use of nearly 40,000 cu. yd. of concrete.

The plant employs a batch mixer and uses open-type, agitator-body trucks for hauling concrete. Cement is received in cars in bulk, conveyed to a storage bin of six-carloads capacity, thence to a small storage bin from which the weigh batcher is fed by Link-Belt bucket elevators. Cement, sand and gravel are proportioned by weight. Gates of the three aggregate bins discharge into one weigh batcher equipped with three scale beams, permitting the weighing of three sizes of materials in one batch without changing beam weights. An additional aggregate bin provides storage for a fourth size of aggregate above the weigh batchers. Concrete is mixed in a 1½-cu. yd. T. L. Smith tilting mixer, having a capacity of 500 cu. yd. daily and powered by a 40-hp. slip-ring motor. Two water tanks, of 33-gallons capacity each, equipped with automatic-measuring devices, are located on an operating platform, with controls so arranged that all activities of operation are performed by one man.

The heating plant consists of a 50-hp. American Hoist & Derrick Co. vertical-tube boiler directly beneath the cement-storage bin, which is enclosed to serve as a boiler room 22 ft. in diameter. Pipe coils of 1½-in. black pipe, spaced about two feet, and one foot from sides of bins are placed around the large aggregate bins above the weigh batcher. Mixing water is heated by a No. 56 Sims, Type J instantaneous heater; it is capable of heating the required amount of water for a 1½-cu. yd. batch of concrete from a temperature of 50 deg. to 180 deg. F. in one minute. A Dayton Whirley crane handles the sand and gravel from cars to storage bins and to the bins above the weigh batcher. There is a fully equipped laboratory for testing and research work.

Thirteen White trucks, equipped with Blaw-Knox agitator bodies, of two- and three-cu. yd. capacities, are used for transporting concrete. The three-cu. yd. trucks are of the high-lift type, permitting discharge of material eight feet above the ground.

Officers of the firm include Colonel John L. Humbard, president, who also is president of the John L. Humbard Construction Co.; Joseph G. Humbard and Ben P. Humbard, vice-presidents; Joe B. Davis, secretary-treasurer, and T. L. Peters and Herbert L. Kidd, directors.

The plant was designed by the Blaw-Knox Co., Pittsburgh, Pa., which also furnished all structural steel, bins and weighing equipment.

Speed Construction of Illinois Gravel Plant

Aided by ideal weather, construction work on the new $100,000 sand-and-gravel plant of the Sheridan Sand & Gravel Co. at Sheridan Ill., is going forward at a rapid rate. The plant is expected to be ready for operation by the end of March.

More than 2,000 feet of new railroad tracks have been laid from the Burlington Railroad to the new plant, located about three-quarters of a mile southwest of the village.

The new plant, on the east side of the Fox river, will be located one-half mile south of the old operations. The screening tower will be 65 feet high and will be equipped with modern machinery for the screening, storage and washing of gravel and sand.

The Sheridan Sand & Gravel Co., headed by L. A. Wilson, of Ottawa, Ill., owns 78 acres of land along the river, near the plant. This acreage is estimated to contain 20,000,000 tons of marketable sand and gravel.

Gypsum President Sees Building-Volume Gains

Building will continue to gradually increase in volume through 1931, Melville H. Baker, president, told the annual meeting of the National Gypsum Co. at Buffalo, N. Y., recently. He said that the company had a satisfactory year in 1930 and entered 1931 in excellent position for continued good results. He said that the company's major products of plaster, lime, wall board and insulation material should have a good market this year. Directors were elected as follows: J. W. Anderson, Detroit; E. W. Borer, Philadelphia; W. M. Currie, Hamilton, Ont.; David Elder, New York; E. F. Guth, St. Louis; V. W. Nelson, Chicago; C. E. Thompson, Hamilton, Ont.; C. E. Williams, Chicago; M. H. Baker, E. E. Finck, W. G. Houck, Buffalo, and H. H. Burkhardt, Snyder, N. Y.

Granite Company Sells N. C. Cyanite Deposits

A mining company represented by Joseph T. Tower, mining engineer, 15 West Thirty-eighth St., New York, has leased deposits containing cyanite in the Black Mountain district, near Burnsville, N. C., owned by Yancy Granite Co., Burnsville. The acquiring company will install machinery for raw-material production and later plans to build a mill to operate under a new concentration process. V. L. Mattson is head of the mining organization.

New Plant Will Coat Stone for Road Work

EXPECT COMPLETION BY MAY 1

Production of asphaltic-coated crushed stone will be undertaken by the newly-organized Bituminous Products, Inc., of Buffalo, N. Y., from a plant to be located at Cheektowaga, N. Y., according to H. E. Rainer, treasurer, 866 Ellicott Sq., Buffalo.

Contract for the plant and equipment has been awarded the J. D. Farasey Co. of Cleveland and construction is to start immediately. It is expected that the plant will be in operation by May 1 of this year. William Tarbell of Erie, Pa., has been engaged as superintendent and began his duties March 10.

The new plant will be located near the crushed-stone operations of the Federal Crushed Stone Corp. at Cheektowaga and stone will be supplied by that company for coating. The product will be designed to meet the specifications of the New York state highway commission and will be used exclusively for road work.

Officers of the new concern, in addition to Mr. Rainer, are M. J. Beistle, formerly associated with Allied Products, Inc., Cleveland, president; C. E. Buchman, vice-president, 728 Ellicott Sq., Buffalo; and C. S. Wicker, secretary, 866 Ellicott Sq., Buffalo.

Ohio Plant of McGrath Company Being Rebuilt

The installation of a completely new mechanical plant was begun at the McGrath Sand & Gravel Co. plant northwest of Chillicothe, O., about January 1, and will be finished about June 1, at the cost of approximately $130,000, according to reports.

This will be the third complete set of new machinery to be placed here since 1904, when the McGrath company located at Chillicothe. The first plant's capacity was twelve cars a day, while the new installation will be able to handle approximately 150 cars a day. The present equipment, which will cease operation as soon as the new machinery is installed, has a rated producing capacity of 75 cars per day.

The old machinery will continue to be in use until late spring, following which it will be torn down. As much of it as possible will be placed in operation at the three other McGrath plants and the remainder will be salvaged and sold.

Headquarters of the McGrath company are in Lincoln, Ill.

Lone Star Texas Plans Houston Improvement

The Lone Star Cement Co., Texas, is reported to be contemplating the construction of a new kiln building at its Houston plant to cost close to $75,000 with equipment.

Uniform Mapping Plan Urged by Geologists

GATHER AT NATION'S CAPITAL

Closer coöperation among the individual state geological commissions was urged at the recent meeting in Washington, D. C., of the Association of American State Geologists, H. A. Buehler, director of the Missouri Bureau of Mines and Geology, calling attention to the lack of coöperation among states in working out a uniform mapping system. Some states have different scales in their system, he pointed out. Furthermore, he stated that it is necessary for states to adopt a uniform nomenclature for their maps. Similar geologic situations in different states are identified under different terminologies, which are confusing, he explained.

W. C. Mendenhall, acting director of the Federal Geological Survey, said that there were common problems among the states which would have to be worked out through closer coöperation. Each state should know the needs of the other states so that their common needs might be considered as a whole, he said. An informal exchange that can keep the association in touch with state problems should be developed, Walter F. Pond, of Tennessee, added.

Bellevue United Stone Names 1931 Directorate

Directors and stockholders of the Bellevue United Stone Co., Bellevue, Mich., held their annual meeting recently. The following directors were elected for 1931: John L. Hoyt, Frank Sedlecky, Steven and Ernest Pasztor, John Sharkey, Earl Kelley and Julius Kennedy. The election of officers will take place at the March meeting of the directors.

Tennessee Quarry Firm Moves General Offices

The general offices of Artstone Quarries, maintained at Etowah, Tenn., for the past year, have been moved to Crossville, Tenn., where the company has its quarries. A. J. McClary is president of the concern and E. Rhode is vice-president.

Regional Cement Safety Meet Held at St. Louis

Under the chairmanship of F. R. Loveridge, superintendent of the St. Louis plant of the Alpha Portland Cement Co., the annual regional safety meeting of the mills affiliated with the Portland Cement Assn. was held February 24 at the Hotel Coronado, St. Louis.

The morning session was devoted to talks by Stanley Owens, safety engineer of the association; D. B. Coleman, safety engineer, and O. F. Schulzke, superintendent, Missouri Portland Cement Co.; R. W. Hayden, Hannibal, Mo., plant, Universal Atlas Cement Co.; and W. W. Hamilton, Alpha Portland Cement Co., St. Louis.

The principal afternoon speaker was J. M. Stolle, superintendent of bags and packing, Universal Atlas Cement Co., who spoke on the topic, "Investigation of Serious and Fatal Accidents."

Roy E. Hoffman, superintendent of the Universal Atlas plant at Hannibal, Mo., was the toastmaster at the banquet in the evening.

Flames Destroy Derrick House at Indiana Plant

Fire destroyed a derrick house on the property of the Koch Sand & Gravel Co., Evansville, Ind., recently. All of the equipment in the building was rendered unfit for future service, according to press reports. The gasoline-storage tanks nearby were saved by firemen, who concentrated their efforts upon them to prevent an explosion, which might have caused much greater damage.

Gravel Firm Will Erect New Plant at Dayton, O.

The Moraine Gravel & Sand Co. was formed at an organization meeting held at Dayton, O., recently. The concern has been incorporated and authorized to issue 250 shares of no-par-value stock. A plant is to be built this spring on the Springboro pike near Dayton. Incorporators of the new firm are Clifton Hoolihan, president; E. B. Raymond, and Thomas H. Ford, all of Dayton.

Cumberland Sand Leases Site at Carthage, Tenn.

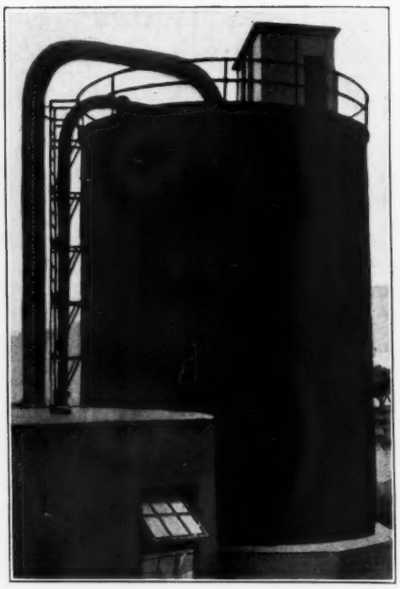
The Cumberland Sand & Gravel Co. of Nashville, Tenn., has leased a portion of the river front at Carthage, Tenn., preparatory to operating at that point during the present season. One of the company's largest dredges will supply river material for distribution from the new Carthage plant.

Lenawee Sand & Gravel Selects New Directors

At a recent meeting of the Lenawee Sand & Gravel Co. of Tecumseh, Mich., the following directors were elected: J. T. Carpenter, Blissfield, Mich.; Fred Blouch, Holloway, Mich.; Frank H. Hoffman, Monroe, Mich.; Frank Schuler, Clinton, Mich.; J. E. Murphy and Charles Thurlby, Tecumseh, Mich.

Cement Company Changes Offices in Cleveland, O.

The Standard Portland Cement Co. announces the removal of its offices from 1741 Union Trust Building to 925 Midland Bank Building, Cleveland, O.



Dust collector at lime plant.

Employs Dust Collector for Handling Quicklime

At the plant of the Sand Lime Products Co., Detroit, Mich., a Sly dust collector is part of a system for handling quicklime from cars to a steel storage bin. High-calcium, quick-hydrating lime is received in bulk in boxcars. It is unloaded by hand scoop-shovels, at a rate of three to five tons per hour, to an inclined belt conveyor. Passing over a magnetic pulley to remove tramp iron the lime falls into a Sturtevant No. 0 hammermill pulverizer with closely spaced bars set to result in a product of about 80 per cent passing 100-mesh screen test.

On the same shaft with the pulverizer and driven by the same motor is a centrifugal blower with a capacity of 2,000 cu. ft. of air per min. against a total pressure of 12 oz. Air is sucked through the pulverizer bars, and additional air enters under the pulverizer to set up a high velocity at this point which picks up all lime passing the pulverizer bars and carries it through an 8-in. pipe to the top of a cylindrical steel bin.

The air enters the bin tangentially at the top, whirls inside, drops most of its lime, and returns from the center of the top of the bin partly to the top of the pulverizer and partly to the passage below same, ready to repeat the cycle. To keep down dust, it is advisable to create leakage into the system at the pulverizer intake. This necessitates an outward leakage at some other point. A dust collector on top of the storage bin, at a point where pressure is above atmospheric, provides this leakage.

Effective use is obtained by keeping the collector cloth fairly clean. Dust at the pulverizer is the indicator of a dirty collector cloth. The ordinary hand shaker is all that is necessary to clean the cloth and to keep it working properly.

Producers Copoerate in Research Program

MAKE CONCRETE-MASONRY TESTS

A concrete-masonry research program is being conducted jointly by the Concrete Masonry Assn. and the Portland Cement Assn. Subscribers to the fund behind the project include the following concerns:

Hamden Building Tile Co., Inc., Hamden, Conn.

J. F. Apfield, Bloomington, Ill.

Chicago Haydite Building Units, Inc., Blue Island, Ill.

Martin Thorsen, De Kalb, Ill.

Elmhurst-Chicago Stone Co., Elmhurst, Ill.

Holm-Page Block, Sand & Gravel Co., Rockford, Ill.

Camden Cement Tile Co., Camden, Ind.

The Cement Products Co., Davenport, Ia.

Cement Products Co., Estherville, Ia.

Cinder Concrete Units Corp., Boston, Mass.

Fall River Cast Stone Co., Fall River, Mass.

Forsberg Cement Block Co., Worcester, Mass.

B. A. Crandall, Benton Harbor, Mich.

Standard Building Products Co., Detroit, Mich.

Van E. Dailey, Howell, Mich.

Casper Haas, Kalamazoo, Mich.

Markle Cement & Coal Co., Muskegon, Mich.

H. A. Boyer Co., Faribault, Minn.

Volz Art Stone Co., Clayton, Mo.

D. H. Merritt & Sons, Lincoln, Neb.

Reimer's - Kaufman Co., Lincoln, Neb.

Harding's Fuel & Supply Co., Omaha, Neb.

Ideal Cement Stone Co., Omaha, Neb.

Omaha Concrete Stone Co., Omaha, Neb.

Shellberg Sand & Gravel Co., Omaha, Neb.

F. D. Shields Co., Inc., Omaha, Neb.

Frank Whipperman, Omaha, Neb.

Waterside Concrete Works, Bronx, N. Y.

Ray Perrigo, Malone, N. Y.

Southampton Cement & Supply Co., Inc., Southampton, N. Y.

Nepperhan Concrete Products Corp., Yonkers, N. Y.

Carthage Concrete Block Works, Cincinnati, O.

Crew Builders Supply Co., Norwood, O.

Bradford Building Block Co., Inc., Bradford, Pa.

Shellito Block Co., Grove City, Pa.

Builders Concrete Stone Co., Pawtucket, R. I.

Newton D. Benson, Providence, R. I.

Penniman Concrete & Material Co., Dallas, Tex.

Grays Harbor Cement Products Co., Aberdeen, Wash.

Concrete Masonry Units Co., Tacoma, Wash.

Yakima Cement Products Co., Yakima, Wash.

Kanawha Cement Block Co., Charleston, W. Va.

Beloit Concrete Stone Co., Beloit, Wis.

Wausau Concrete Co., Wausau, Wis.

Dolese & Shepard Earns $4 per Share on Common

Unsoundness in the building industry, as well as in other lines, cut sharply into the earnings of Dolese & Shepard Co., Chicago crushed-stone producer, in 1930, according to the annual report recently issued. Net income for 1930 amounted to $76,704, equal to $4 a share on the stock outstanding at the end of the year. This compares with net income of $172,591, or $9.01 a share, earned in 1929.

O. P. Chamberlain, president of the company, in his statement to the stockholders, said: "We have just passed through a year of small demand, low prices and little profit in all lines connected with the building industry. The crushed-stone industry has shared in the general depression. It has been estimated that the volume of the 1930 building material business in the Chicago district measured in dollars was only 31 per cent of the business of 1929.

"One feature of our 1930 business is encouraging. While our total sales were off 33 per cent from 1929, our sales in deliveries outside of the Chicago switching district were 4 per cent greater in 1930 than in 1929."

Will Develop New Salt Deposit at Hockley, Tex.

The Houston Salt Co., Houston, Tex., is planning the development of a large rock-salt deposit near Hockley, Tex., and will install a temporary crushing and screening plant soon. Plans will go forward later for permanent structures, including a main multi-storied mill, a storage and distributing unit, and a crushing plant at the main shaft. A housing development for employees is planned. The project will cost over $160,000 with machinery, it is reported.

Cement Firm's Magazine Starts Twentieth Year

With the February, 1931, issue the "Dealer," a monthly magazine, began its twentieth year of circulation among dealers in and distributors of Universal cement. Through the consolidation, a year ago, of the Universal and the Atlas companies, the distribution of the magazine was almost doubled. Many of the articles in this periodical are written by dealers and often do not even mention cement or concrete, but deal with credits, costs, displays, yard plans, deliveries and other related subjects.

Sees Marked Advance in Business Shortly

CEMENT CHIEF IS OPTIMISTIC

Each person can be of assistance, even if it be only in a modest way, in relieving the business tension which has existed for more than a year, and he should recognize his opportunity and responsibility to do so, in the opinion of E. E. Duque, vice-president and general manager of the California Portland Cement Co., Colton, Cal.

"My own prediction is that a marked upgrade in business will be noted after the first of April, soon after the issuance of the quarterly business reports," Mr. Duque continued. "These reports probably will not be encouraging, however, as they must reflect the status of business over the preceding three months.

"Thereafter, throughout the year, there should be a gradual and worthwhile improvement in business and commerce, and the year as a whole doubtless will be closed with reports of the healthy, substantial advance which will have been made.

"The evidences which make this prediction possible are most definite and convincing, and it is proper that people everywhere should be called upon to do their part. They should realize that conditions soon are to be improved and that great caution now not only is unnecessary, but possibly harmful to their own interests and those of the nation at large.

"It is a time for people to keep their feet on the ground, but to have their heads up. They should not be extravagant and hold to any ideas of great booms, although they may see the future clearly and progressively, and possibly show more enterprise in their work or business."

"When corporations can start paying dividends, it will be certain that the commercial recessions have ended," he suggested. "That will mean the corporations have been able to do more business and employ more men. Workers, too, will have benefited, and bankers will realize there will be less chances taken in making loans. Much, then, hinges upon the individual, who can be of real assistance when he assumes the proper attitude toward the true situation of the present."

Subsidiary of National Cement Unites Offices

Offices of the Georgia Cement & Products Co. at Portland, Ga., and Birmingham have been consolidated and moved to Atlanta, being located in the Forsyth bldg., with M. R. Park in charge.

The Georgia Cement & Products Co. has a plant at Portland, Ga., and is an associate company of the National Cement Co., with general offices in Birmingham and plant at Ragland, Ala.

Editorials

Business Is Getting Better

BUSINESS in non-metallic minerals is doing more than looking up; it is going up. The recovery, hazily foreshadowed several months ago, is proceeding steadily, and, if the present rate of increase is maintained, a return to levels that will satisfy all reasonably ambitious producers is not far away.

As always happens at first, early reports of better business were based more often on spiritual than on material evidence. Every producer was ardently hoping that business would get better and, for that reason, reports were almost always the vocal expressions of wishes unfulfilled. Although scattered reports of actual betterment soon began to come in, they indicated, at most, only "spotty" improvements, encouraging to those who benefited by them, but of no general significance.

The present situation is considerably different. Since the latter part of December a definite upward turn has come. The record of car-loadings of limestone flux, stone, sand and gravel—always a reliable guide for judging sales trends—showed a healthy advance during January. Between the low point of 1930 (reached in the last week of December) and the end of January (the last week for which figures are available) car-loadings increased 48.5 per cent, or, on the average, 9.7 per cent a week. If this rate of increase should continue through February and March, car-loadings at the end of that period would exceed those of the same time last year. And, if they should continue only five or six weeks beyond that date, they would then exceed the highest figure reached during 1930 and would arrive at that point two months earlier than last year.

That these expectations may not be unreasonable is shown by the fact that, although car-loadings during the first week of January of this year were 34.5 per cent below those of the corresponding week of 1930, they had risen, by the last week of this January, to within less than 8 per cent of the corresponding figure of last year. Furthermore, while the first five weeks of 1930 showed a loss of 9.3 per cent, the corresponding weeks of this year showed a gain of 48.5 per cent. The increase shown in car-loadings began at least five weeks earlier than last year, and it has progressed at a rate almost 30 per cent faster than that of 1930.

We see no reason for anything but cheerful confidence in this record of substantial progress; only in case the advance should proceed too rapidly need producers feel anxiety. That this danger is real was shown by the erratic manner in which, during former years, car-loadings rose to abnormal heights and then fell, with costly and sometimes disastrous results, to equally abnormal "lows." There are no "boom" characteristics in the present situation and, in our opinion, no sharp changes will occur during the year. Business is moving upward—slowly, steadily, and at a rate that can be maintained safely and, perhaps, for a long time to come. That is much more than can be said of business during the year 1930 or any of its immediate predecessors.

Road Building in 1931

CONSERVATIVE estimates of road-building expenditures likely to be made this year point to an expected increase of approximately $75,000,000 over those of 1930. This is based on a comparison of national, state, municipal and county programs for the two years, and ignores the relatively insignificant work of township and other minor agencies. Taking $768,198,000 as the value of important work done last year, expectations for 1931 call for an increase of a little less than ten per cent.

This prospect—and it appears to us a reasonable one—presents a good outlook for the road-material business. What the outcome will be is always a matter for speculation, in view of the political elements that seem to be inseparable from road building, but the estimate given is not based on the belief that proposed programs will be carried out fully. A fair allowance for the failure of proposed bond issues and for the possible miscarriage of plans already made makes the ten-per-cent increase stated a conservative estimate, which may, under more favorable circumstances, rise to thirteen or even fifteen per cent.

To producers whose business has languished during the past year a ten-per-cent rise in road-building activity does not promise a rapid return to the prosperity which former years established as a measure for comparison. But it is better that it should be so. A gradual return to a situation that will sustain steady production at capacity rates is much to be preferred to the rapid rises which some recent years have shown, for much of the over-expansion which characterizes the non-metallic-mineral industries is due to the phenomenal increases which building construction, for example, has brought about.

To this tendency toward erratic up-and-down movements in the production curve, the relative stability of road building offers a healthy counterbalance. Road building, being less influenced by the commercial instincts that govern to a large extent the expansion in building construction, is more closely related to actual needs and, therefore, is more likely to follow the curve of growing population. This factor may not satisfy the insatiable demands of the wildcat producer, who expects business to increase annually according to some geometric ratio, that is not clear even in his own mind and certainly is not founded on either experience or reasonable expectations, but it introduces an element of steadiness which is badly needed in our, as well as other, industries. It is really fortunate that

so large a part of the country's annual output of non-metallic minerals enters a field where some factor, other than commercial expediency and exploitation, governs the rate of expansion. This offset to the seemingly inexhaustible activities of business promoters, particularly as shown in the building industry in recent years, furnishes a stabilizing force which the non-metallic-mineral industries may not always appraise at its proper value.

WHEN a labor-bloc member of the Indiana legislature recently introduced a bill for the provision of a state-owned cement plant, cement producers who were not immediately threatened by the proposed competition were inclined to view the act as merely another outburst of our more radical political groups, and as for the subsequent addition of Arizona to the list of states either considering or practicing state ownership, this did not seem to offer dangerous possibilities. To men committed to the operation of privately-owned enterprises it is scarcely credible that tenets so opposed to their beliefs, as are those of government ownership, could be accepted by any considerable portion of the voting multitude, and, with the records of state operation in Michigan and South Dakota available, it would seem impossible to mislead the public by extravagant claims of economic gains for the taxpayers.

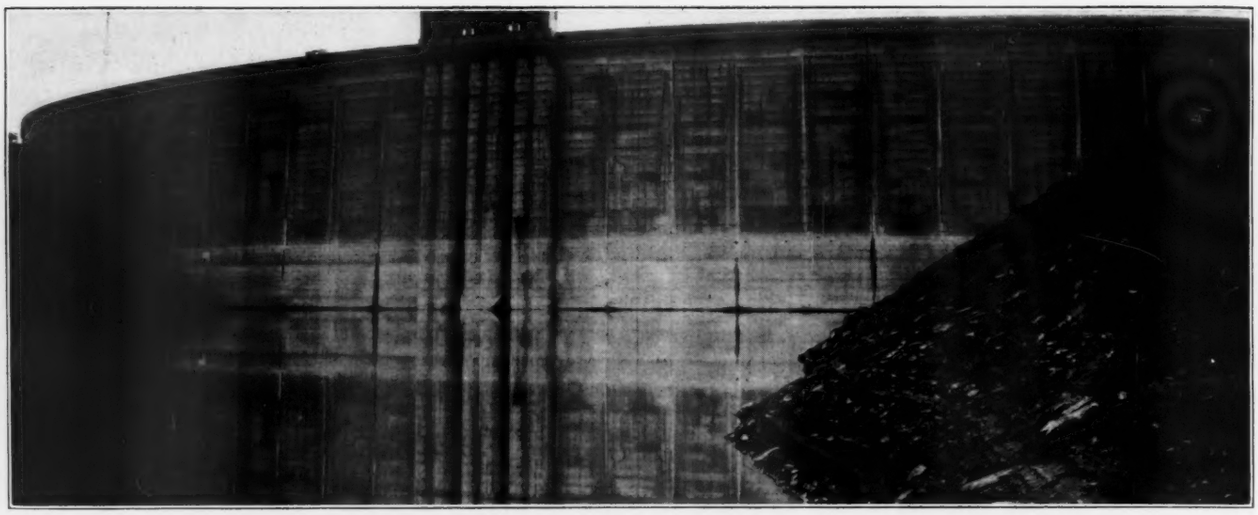
Yet the possibility of state ownership of cement plants in Arizona and Indiana may not be as remote as producers would like to believe, and the competition that would result, if state ownership were adopted, could be much more serious than is probably realized. Even if the proposed state-owned plants could not meet their owners' demands at all times, they would nevertheless remove from the market two worth-while consumers of cement, and, by setting an example to other states, might result in the ultimate loss of enormous portions of the present cement market. Although Arizona may be ranked as one of the less important states from a commercial point of view, its highway expenditures during the last two years were approximately equal to those of Wisconsin, Kansas, Kentucky and similar states and exceeded those of Connecticut, Maryland, and half a dozen others. Indiana is in a class with Missouri and Oregon and spent more money for highway work than either Massachusetts, Louisiana, or Michigan, in the last-named of which the existence of a state-owned cement plant diverted 500,000 barrels of production from private to government agencies in a single year.

The advocates of state-owned cement plants make much of the economy that is alleged to result from government operation, by virtue of which the profit element is eliminated and is supposed to be converted into a proportionate decrease in the cost to the taxpayer. In Michigan, according to Charles F. Foster, secretary of the State Administrative Board, the cement manufactured at the state's plant at Chelsea cost 25 cents a barrel less than privately-manufactured cement sold to the state of Indiana, or a total saving to the public of $125,000 on the 500,000 barrels bought by the State Highway Department. Since this difference of 25 cents a barrel may easily extinguish the private producer's profit, it naturally results that the private producer, except in times of slow business, can not afford to compete with state-made cement. State cement manufacture, carried on in other states on a similar cost-differential basis, could not fail to have a disastrous effect on the cement industry.

As the use of convict labor is a part of the state-owned cement-plant idea, it is conceivable that, in the absence of such an advantage, the state-owned plant could not compete successfully with private manufacture. If the state-owned cement plant were obliged to buy its labor in a competitive labor market, there would be little or no reason for its operation by the state, except as a means for increasing political patronage. As an employer of convict labor the state becomes, in effect, the competitor of free labor, and, as such, contributes to unemployment and unrest. Such of its employees as are convicts have no purchasing power and, therefore, contribute nothing to the industrial expansion of the country. Their competition with free labor reduces the purchasing power of the latter and may, in times like the present, make the support of unemployed free labor a public charge. Under such circumstances the public advantages of a state-owned cement plant could not be easily defended on economic grounds.

While it is not necessarily true that state-owned enterprises can not be as efficiently and as economically administered as those privately-owned, the fact remains that, in most cases in this country, they are not. Public funds are wastefully handled by those responsible for their expenditure, and the addition of state-owned cement plants to those activities already under government control would add only another source of inefficiency and corruption to a list that is already too long. Public officials in this country have not yet developed or shown that degree of responsibility and obligation to the public which is needed to offset the restrictions that competition places on the predatory instincts of the business man. And, until they do, the public's interests are less endangered by private enterprise than by government-owned enterprise.

The real savings that may be realized by state operation of cement plants are, in our opinion, not only inconsiderable, when compared to the hidden losses it entails, but should not be offered as an offset to the public advantages of successful enterprise privately conducted. If those in favor of state-owned cement plants were as industrious in pointing out the disadvantages and public waste involved in their proposals as they are in citing their alleged economies, government ownership would not receive the approbation sometimes given it, especially, as at present, in periods of economic unrest.



Completed view of the new Pardee dam.

Gold-Dredge Tailings Supply Aggregates for Constructing Pardee Dam

Quality Concrete Is Used in Structure to Serve San Francisco's East Bay Area

By C. W. GEIGER

IN the production of concrete for the Pardee dam and Pardee power house for the cities in the East Bay Municipal Utility District water supply, it was the aim not only to obtain, in that concrete, the highest desirable physical properties, but also to achieve a precision of workmanship in the operations of its manufacture that would result in a high degree of uniformity in the ultimate concrete.

About 100 acres of gold-dredge tailings were selected as being the most satisfactory source of aggregate supply. The gravel was excavated by a large drag-line and transported on cars to the base of the washing tower. There it was elevated on a belt conveyor, passed through screens in the tower and washed during the process, being separated into three sizes to facilitate uniformity in the concrete batch assembly. The sizes selected as best fitting these conditions were: sand, minus 3/8-in.; gravel, 3/8-in. to 1½-in.; and cobbles, 1½-in. to 6-in.

The dredge tailings often contained an excess of the gravel and a deficiency of cobbles over 3 in. In order to avoid a waste at the gravel pit greater than the possible saving in the concrete, agreement was made to make necessary adjustments to the mix and to use the output of the pit. This applied only to the coarse aggregate; there was no occasion to run long on sand, it being deposited by the dredge over the bottom of the pit, and the amount produced was controlled by the depth of the digging.

Enough Portland cement was added to the aggregate to make one bbl. per cu. yd. of concrete.

Sand, gravel, and cobbles were transported by a 4-mile overhead tramway from the gravel pit to the dam site, and deposited in large bins.

The aggregates were measured in adjustable volumetric batchers. Cement was weighed into the batch with a plus or minus error of less than 2 per cent. Water was measured by a standard commercial water meter with an indicating set-back register reading in gallons. The use of this meter was a new adaptation on this work and met with unanimous approval for this purpose, because it was accurate and adjustable to varying grading and water content of the aggregates.

In addition to care in securing a thoroughly compacted homogenous concrete in place, a special effort was made to obtain water-tightness on all planes of contact of new with older concrete. Careful cleaning was required throughout the work and, just before concrete was placed, a mortar coat was broomed in.

A continual check was made of the compressive strength of the concrete. Literally hundreds of specimens were tested every day at the mixers and, on each shift, a specimen was made from the concrete newly placed in the dam.

The main gravel excavator was a Monighan Type 3-T walking dragline No. 396, full-revolving on an 18-ft.-diam., structural-steel pedestal, plate bearing, equipped with Fairbanks-Morse 120-hp. full-Diesel Type Y, style VA engine. The excavating equipment included also a Fairbanks-Morse No. 1-A8, 2-stage air compressor; two 20-in. by 60-in. air receivers for starting the engine; a Fairbanks-Morse low-pressure air compressor for operating

frictions; a 2-in. centrifugal circulating pump handling 20 g.p.m. for air-radiator circulation; a 19-ft. by 32-ft. galvanized-iron house and roof; a 70-ft. steel latticed boom; and a Page 3½-cu.ft. dragline bucket.

This excavator was operated 24 hours per day in three shifts. A P & H dragline did the preliminary work which permitted the walking dragline to continue in operation all the time.

The material from the gravel pit was transported to the base of the washing tower by six Western 20-cu.yd., 80,000-lb.-capacity, standard-gauge, air-dump cars with steel doors and ends, and 3-in. long-leaf yellow-pine bottoms covered with ¼-in. steel plates. The cars were 8 ft. 6 in. in height, 10 ft. 4 in. in width, the body being 26 ft. long, 9 ft. wide, and 2 ft. 4 in. deep. These cars were hauled by three Baldwin compound, 6-wheel, saddle-tank, Vauclain type switching locomotives of standard gauge, each having a fuel-oil capacity of 500 gal., and a weight of 94,400 lb.

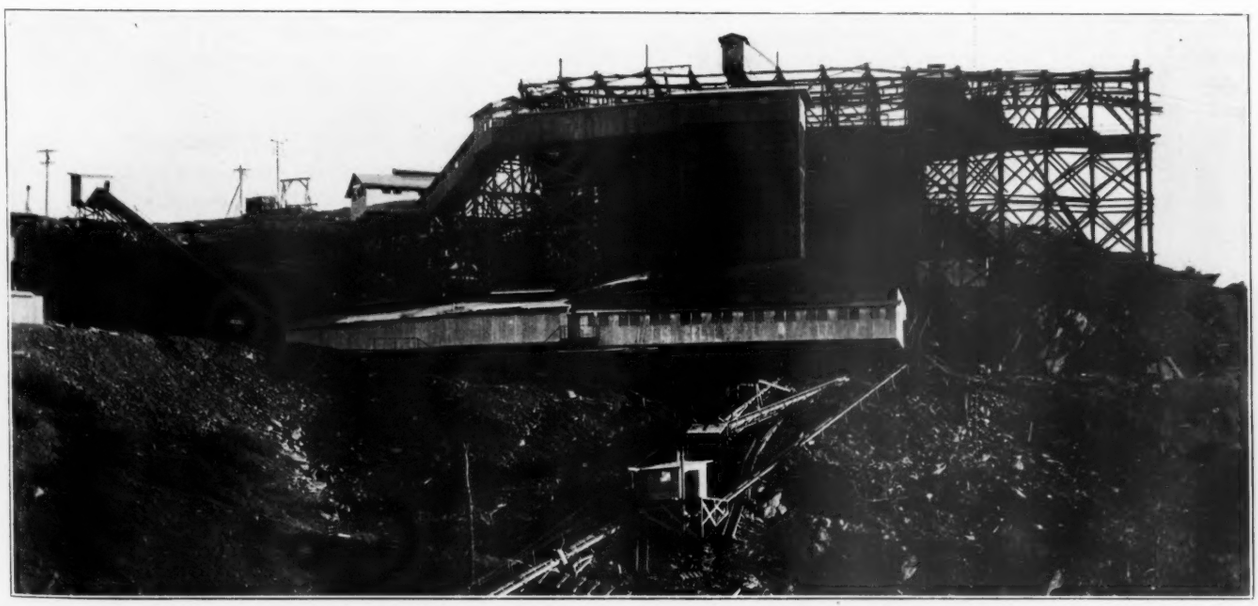
The classifying and screening machinery were of Bodinson make. One of the principal pieces of equipment was an extra heavy, trunnion type, revolving screen, 60 in. in diam., adjustable up to 30 ft. in length. This had screen shells of the removable, offset type, mounted on steel and wood frames with provision for built-in drive, either electric motor or gas engine. This screen could be converted to any length of screening section. As used this screen was 21 ft. in length. The first 12 ft. was of ⅝-in. solid steel with internal flights for scrubbing. The remaining 9 ft. was ¾-in. manganese steel with 7-in. perforations. The countershaft had a diameter of $3\frac{5}{16}$ in. fitted with a heavy cast-steel bevel pinion and a heavy cast-iron spur gear. Running with this gear was a cast-steel pinion mounted on a $2\frac{15}{16}$-in. countershaft with forged-steel cut-spur pinion to fit a 30-hp., 900-r.p.m. General Electric motor. The driving-end bearings, transmission, and motor were carried on a heavy structural-steel frame. The receiving end carried a forged-steel tire 2 in. thick by 6 in. wide. This rolled on two extra-heavy 30-in. diam., 6-in. face, chilled trunnion wheels carried on a $3\frac{1}{16}$-in.-diam. shaft adjustable with 2-in. horizontal movement to insure alignment. The approximate weight of this screen and scrubber unit was 33,750 lb.

There was also a Bodinson extra-heavy, revolving screen, 48 in. in diam. adjustable up to 30 ft. in length. The screen shells were removable, of the offset type, mounted on a steel-and-wood frame, with provision for a built-in electric-motor or gas-engine drive. This screen could be converted to any length. With the screening section fixed at 20 ft. in length, the inner shell of ⅝-in. steel had 1¼-in. perforations, and the outer shell, 72 in. in diam., was made of ¼-in. steel with ¾-in. perforations. This screen was identical in specifications regarding bearings, wearing rings and driving mechanism, with the 60-in. scrubber screen, and it had an approximate weight of 26,000 lb.

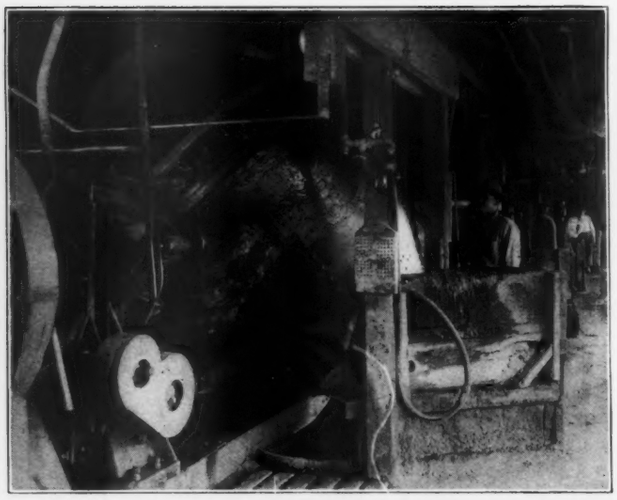
There were also eight Bodinson conical screens, each 48 in. in diam. at the small end, 66 in. in diam. at the large end, and 84 in. long overall; two Bodinson duplex sand classifiers and washers with rakes, 36 in. wide and 18 ft. long; and two direct-connected, self-contained, reciprocating feeders with 30-in.-width feeder plates.

The material was dumped from the 20-cu.yd. cars into the boot and, in turn, fed onto a 42-in. rubber-belt conveyor by the two feeders. All the rubber-belt conveyors were of the Pioneer Rubber Co. manufacture. The 42-in. conveyor was 400 ft. in length and discharged into the main scrubber screen, the water being supplied by a Fairbanks-Morse centrifugal pump driven by a 100-hp. Fairbanks-Morse motor and having a capacity of 3,000 gal. per min.

Oversize cobble stones were crushed in a Traylor Bulldog 28-in. by 36-in. jaw crusher, and the crushed material was returned by a 24-in. belt conveyor.



General view of the concrete-mixing plant on the south bank.



Battery of 2-cu.yd. mixers which discharge to the control hopper below.

From the scrubber screen, gravel up to 1¾-in. and sand were conveyed into a conical scrubber screen driven by a 10-hp. General Electric motor, direct-connected. After passing through the conical screen the sand was discharged into the Bodinson sand classifiers. Below the sand classifiers were Hungarian gold riffles which recovered a considerable amount of gold.

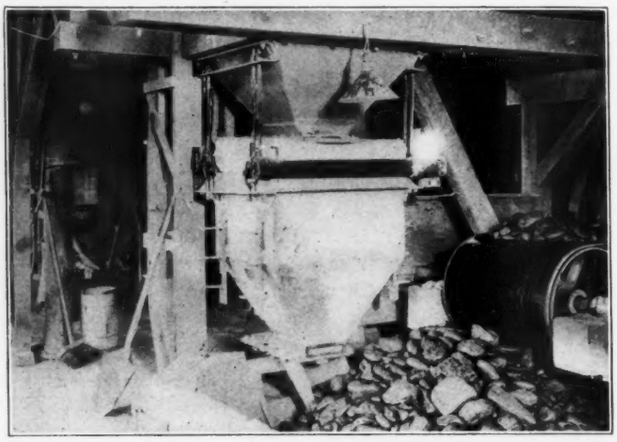
After passing through the 48-in. rewasher screen, the material was discharged onto a belt conveyor 30 in. wide by 250 ft. long, operating at 350 ft. per min. and delivered to the trestle over the open-storage piles. A 30-in. self-propelled tripper traveling over the storage piles discharged the material at any desired point.

Beneath the storage piles was a tunnel running the full length of the storage piles. By means of gates installed in the roof of the tunnel the material was discharged directly from the piles onto a 30-in. belt conveyor, operating at a speed of 300 ft. per min., and delivered into the loading terminal bin of the American Steel & Wire Co. 18,700-ft. tramway which carried the material to the Pardee dam-site.

The success of the construction program was, in large part, due to this aerial tramway. Its maximum usefulness came during August and September, 1928, when concrete delivery to the dam reached more than 67,000 cu. yd. per month. The tramway was designed for a capacity of 440,000 lb. of gravel, or 146.7 buckets per hour. During the 79-day period from August 1 to October 19 it operated 235 shifts and transported 232,812 buckets of material from the washing plant to the bunkers at the dam site. By its installation the Atkinson Construction Co. was saved the construction of 8 mi. of railroad. The tramway cables were divided into sections about 4,500 ft. long, each cable being anchored at one end and counterweighted at the other, thus maintaining a constant, known cable tension in every span. All cables were of the locked-coil type, which gave smooth cylindrical track for the carriage wheels. The buckets were carried by articulated, 4-wheel carriages, so designed as to distribute the load uniformly over the four wheels and thus insure minimum bending or flexure of the track cables. Each bucket was of 32-cu.ft. capacity and carried 1½ tons. The speed of the traction rope was 470 ft. per min., and the buckets were spaced 192 ft. apart, with a time interval of 24½ sec. The traction rope was ⅞-in. crucible steel.

At the loading terminal there were six chutes in the bin spaced 8 ft. apart, for loading tramway buckets. The loading bin was divided into three compartments of which one carried sand, one small-size stone, and the other large-size stone. A stream of water was turned into the material as it was discharged into the tramway buckets, giving the material its final wash. There was a total of seven washings.

The loading terminal and discharge terminal were connected by telephone. The operators at the loading terminal and at the crushing plants were notified some time ahead as to what material was required at the mixing plant, so they could send out sand, fine stone, or large stone, as required.



Weigh batcher and cement hopper at end of aggregates conveyor.

The discharge terminal was on top of the storage bins at the mixing plant. The tramway buckets, which were of the end-dump gated-hopper type, were guided through the entire length of the station by parallel overhead guides. Three longitudinal bins or compartments were served by three independent lines of overhead track rails which were given a grade so that the buckets, after automatically detaching from the traction rope, continued with uniform speed and dumped their loads while in motion at desired points. Sand and two sizes of stone were delivered to each of the three 2,000-cu.yd.-capacity compartments.

The material was discharged through the floors of the bunkers into twelve Blaw-Knox batchers. Eight of these were standard batchers equipped with adjusting rods and each having a capacity up to 36 cu. ft. Four were special extra-heavy, large-stone batchers with reducing collars adjustable from 9 cu. ft. to 21 cu. ft. The batchers discharged into four 30-in. belt conveyors feeding the mixer hoppers.

Cement was brought from the Calaveras cement plant, located in Calaveras County, by the Southern Pacific lines to Valley Spring, and from Valley Spring to the dam-site over a 5-mile branch line

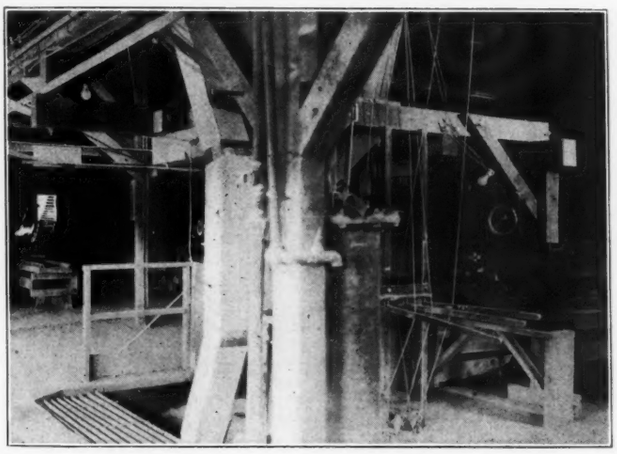
constructed by the contractor. The cement was received in cloth sacks and dumped from them onto an 18-in. Link-Belt conveyor, 70 ft. in length. This conveyor discharged onto a second belt conveyor, 90 ft. in length, which, in turn, carried the cement to the head of the cement silo where it was stored to a depth of 30 ft.

By means of Link-Belt screw conveyors the cement was delivered to the four Blaw-Knox cement weighing batchers, one located above each mixer hopper. The cement was weighed and discharged into the Smith mixer hopper along with the three sizes of aggregate. More than 3,000,000 sacks of cement were used in the Pardee dam project.

The concrete mixers were Smith 2-cu. yd., tilting type, mounted on steel skids and equipped with power tilting devices, each being driven by a 50-hp. General Electric motor. Operating at 10 r.p.m., the mixing time per batch was 1½ min. There were two 42-gal., steel water-tanks for each mixer.

The mixers tilted into discharge chutes which converged to a control hopper located on the hillside below the plant. For the first 200 ft. of the dam the concrete was delivered through an Insley chute, 20 in. diam., by gravity to the base of the 520-ft. Lakewood 2-compartment, steel concrete tower.

The main concreting tower was erected in the center of the dam. When the concrete was poured to a point where the tower emerged from the face



Scales for weighing cement. Note control levers at right center.

of the dam two Bodinson 36-in. conveyors were installed to handle the concrete from the central hopper to the concreting tower at an elevation about level with the central hopper. This saved the time and power that would have been required to hoist the concrete from the base of the tower for the first 200 ft. and it enabled the contractor to remove the tower in the base of the dam and to fill the resulting hole which the tower had occupied. The main tower gave coverage for the main part of the dam and it fed a 200-ft. tower on the far side which completed the coverage at that end of the dam. On the near side, another 200-ft. tower was fed by concrete cars traveling on an inclined railway from the central hopper to the base of the tower.

Inundation of the sand was not practiced, but daily moisture determinations were made and the proper amount of water to be added was calculated. To decide the total water, slump tests were made, but much dependence was placed on the appearance and consistency of the concrete as it arrived at the dam. Water was measured into the mixers by Neptune water meters equipped with dials having turnback pointers; so that the water for each batch was directly indicated and a summation or total could be read from the dial. This permitted the checking of the total quantity of water used against the total number of batches placed.

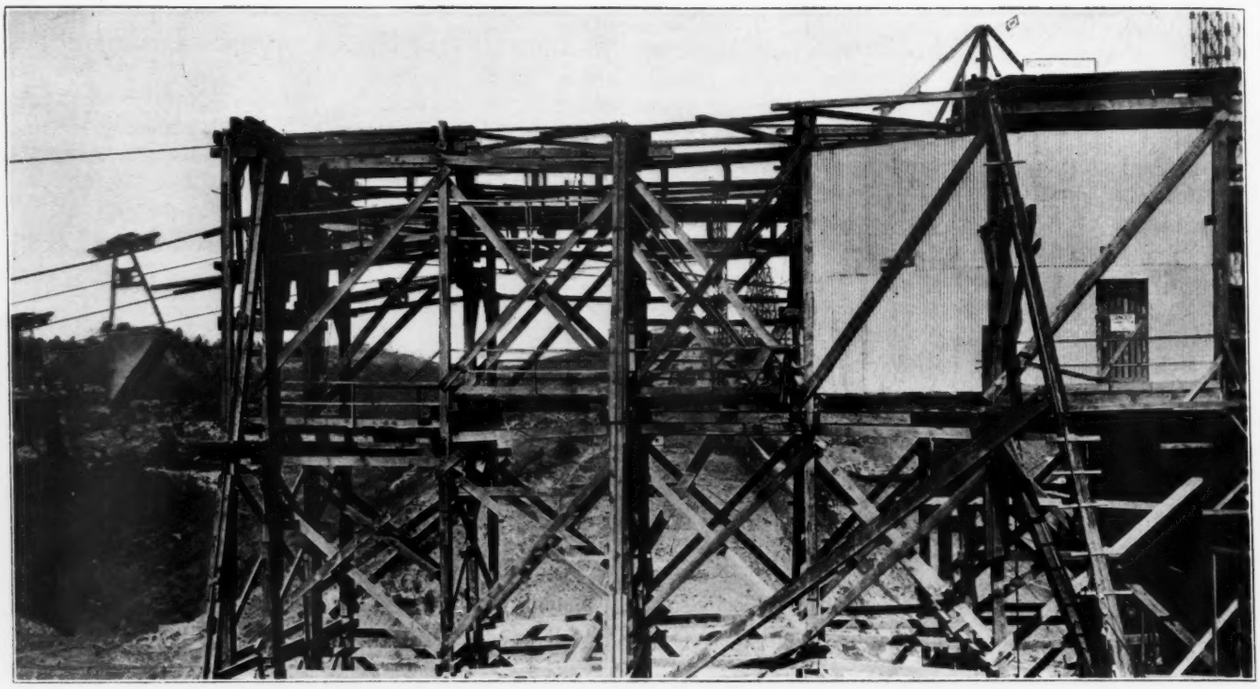
The concrete was placed in blocks between contraction joints located on radial lines of the dam. All contraction joints were recessed and were provided with vertical grout holes spaced 10 ft. apart. In placing concrete, pours were made to depths of 5 ft. It was the general practice to pour on the two night shifts, beginning at 4 p.m. and ending at 8 a.m. the next morning. Between 8 a.m. and 4 p.m., time was available for the clean-up of the surface, placing forms, and other necessary operations.

At times, three-shift placing of concrete was practiced. By moving the "elephant trunk" from which the concrete spouted at frequent intervals, excessive flow of the concrete was avoided. A placing crew of 15 men worked over the concrete as it was poured under the direction of an inspector.

On the shift following the placing of any layer of concrete, the surface was thoroughly brushed with stiff wire brooms to remove the laitance before it had hardened and, a little later, before the next layer was placed, the old surface was given a thorough cleaning. Picks and shovels were used and everything was swept up with the wire brooms and washed away with a stiff jet of water mixed with compressed air. Before any concrete was placed on an old surface, cement grout was spread thinly over the surface, using wire brooms to work it into the irregularities of the surface.

The control of the concrete was maintained with test cylinders taken daily from the main concrete chute at a point below the mixing plant, and additional cylinders were taken from the material already placed on the dam. All cylinders were taken by inspectors employed by the East Bay Municipal

A 10-in. test cylinder of concrete as used in the dam broken in the laboratory after 28 days' curing.



Buckets on the aërial tramway entering and leaving the gravel bunkers.

Utility District and were broken, after 7 days, 28 days, 3 months, and 6 months, in a 200,000-lb. testing machine.

From the sample each day a cylinder was made, and ten minutes later, so as to be of presumably the same concrete, another was made by the inspector from the concrete newly placed in the dam. The specimens from the dam consistently showed higher strengths.

The dam design called for concrete with 1,500-lb.-per-sq. in. compressive strength in 28 days. After all concrete had been placed, the average of the 28-day strengths was 2,885 lb. per sq. in.

The concrete mixing was under the supervision of L. H. Tuthill, concrete technologist for the East Bay Municipal Utility District.

The construction of the $6,000,000 Pardee dam, set up a new world's record for the amount of concrete mixed and placed in a given time. Over 615,000 cu. yd. of concrete was mixed and placed in less than 24 months. Approximately 1,500,000 tons of aggregate was used.

The Pardee dam is named in honor of Dr. George C. Pardee, president of the East Bay Municipal Utility District and former governor of California. The dam is of 358-ft. maximum height, and 1,347-ft. crest length. The roadway across its crest is 575 ft. above sea level.

From the day when Lynn S. Atkinson of the Atkinson Construction Co. signed the contract as the low successful bidder, the problem was to produce and place concrete on a quantity basis which would net a profit. Associated with Mr. Atkinson were William A. Kettlewell and Guy F. Atkinson. The three partners determined upon the largest and most efficient layout of mechanical equipment that could be fitted into the situation. This involved an outlay of about $1,250,000 for equipment.

For the East Bay Municipal Utility District those in charge of the dam were Arthur P. Davis, chief engineer and general manager; F. W. Hanna, chief designing engineer and, during the latter part of the work, chief engineer and general manager; and James Munn, chief construction engineer. Stationed at the dam were C. E. Grunsky, Jr., division engineer; E. L. McDonald, resident engineer for the district; and E. M. Whipple, superintendent for the contractor.

Great credit is due the board of directors and the well-chosen engineering organization of the East Bay Municipal Utility District. They carried through a big and difficult project well within the estimated cost and in less than the estimated time.

Bulletin Cites Available References on North American Geology

The bibliography of North American geology for the ten years 1919-1928, just issued by the United States Geological Survey as Bulletin 823, is an almost indispensable working tool for geologists in active service. It lists publications on the geology of the continent of North America and the adjacent islands, Panama, and the Hawaiian Islands. The main list is arranged alphabetically by authors and is followed by a very full index to the literature cited. This volume supplements Bulletins 746 and 747, which covered the same ground for the years 1785-1918, and the three bulletins therefore afford a complete picture of the vast amount of study that had been given to North American geology to the end of the year 1928. Bulletin 823 contains over 1,000 pages and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for $1.25.

Safeguarding Employees in Maintenance and Plant-Reconstruction Work*

By MERLE D. DARRAH
Safety Engineer, Bureau of Safety, Inc., Chicago, Ill.

THE title of this paper might well be called "Safety in Construction." This subject without a doubt is one of the most important and by far the most perplexing problem that confronts the industrial safety man today.

The construction employee, next to the man employed in the mining industry with its terrible fire and cave-in disasters, is engaged in an occupation the death toll of which is the highest in American industry.

To the construction foreman, I would say, "The average man you have today will be gone within a month. Many construction departments and companies experience well over 1,200 per cent labor turnover a year." It is almost impossible for any employee to be fully experienced in every phase of a construction project. In construction the same circumstances or problems are seldom met with more than once.

The construction supervisor should know that, to a large extent, his insurance rates depend on his accident record. On the usual industrial construction job, one of every 13 dollars of payroll is spent for accident insurance. The supervisor should also realize the fact that an operating crew's efficiency is often completely ruined by one serious accident.

To the man responsible for safety, and now I speak to everyone from the president to the water boy, I would like to encourage with the fact that, with a well conducted campaign and full, active coöperation on everybody's part, accident reduction on construction work can be and has been phenomenal. With all its problems and the fact that any construction project is constantly changing, safety work is confined to its fundamental phases.

It is a well-known fact and often-used alibi that 75 per cent of all construction accidents can be traced to the failure of the individual. This can best be demonstrated by a recent accident that came to my attention. On a small building construction job a crew of six men were engaged in tipping a heavy I-beam onto rollers to move it into its final resting place. Two men were given bars to pry on the bottom of the beam while the other four pushed. The hazard of the bars slipping was seen by an old employee and, to counteract it, warning was given to push on the top of the beam and not to get their fingers under it. Thirty seconds later the expected took place and a man's fingers were caught. After lifting the beam and freeing the man, it was lowered on a second man's fingers.

This accident demonstrates the four types of mentalities:

No. 1—The old employee who had the intelligence to foresee an accident.

No. 2—The unhurt employees who would gain experience by being told.

No. 3—The first injured man, who could learn only from his own experience.

No. 4—The second injured man who could not learn from the experience that he had seen.

The potential hazard of the latter types of intelligence can easily be seen and it is every supervisor's duty to remove men of these classes from his organization. Keep the men who use their brains and the efficiency and safety will be multiplied. By watching a crew of men at work it is not a difficult task, for hundreds of trivial incidents test men's mentalities. Elimination of such men is for the best of all concerned because it does not always happen that the non-thinker hurts himself. Besides the expression is applicable that the poor house is more pleasant than the morgue!

Employees may be classed in two physical divisions depending upon the coördination between their minds and muscles. The employee with poor coördination is the man who drops things—the man who stumbles and the "unlucky" man who can never experience a hazard without being caught. Tests for coördination are very simple and anyone can apply them. To cite a few briefly, these include:

1. Stand at attention with feet parallel and then with the eyes shut try to balance on one foot.

2. Point at a 12-in. disk 20 ft. away, close the eyes and walk toward the disk. Anyone striking the disk with his finger has excellent coördination.

Medical tests for eyesight, hernia, varicose veins and diabetic conditions are important. A dependable doctor should examine all prospective employees for these defects.

Eliminate the physical, mental and medical hazards from the job. Instill the desire for safety into the minds of the remaining employees and your reconstruction or maintenance safety problems are 75 per cent solved.

Selling safety to the employee is every man's duty. Old employees can and, in many cases, do by means of timely warning. Foremen can do their part by alertness on the job and, by activity at safety meetings, may remove all doubts of their interest from the minds of their men.

Higher supervisors have a more difficult duty. They must not only keep the foremen and men interested, but also must demonstrate their interest by taking an active part in safety meetings and following up with immediate action on every safety suggestion. They should investigate every accident of any consequence and use their authority in preventing its repetition. They are responsible for the mechanical part of safety and should assure

* Presented Jan. 22, 1931, at regional safety meeting, Portland Cement Assn., Dallas, Tex.

themselves that the work is done in as safe a manner as is possible.

General letters from the executive's desk have a great effect in the field. Every executive should be interested in stopping a cash leak that amounts to as high as eight per cent of his payroll. His wholehearted support is necessary to obtain the coöperation of those under him. He should keep closely in touch with his accident record and never fail to urge those under him to intense activity to reduce his experience.

To the safety director, engineer, or inspector I feel the right to speak more freely as I include myself in the profession. We sidestep the hazy but vitally important question of human engineering for the less important but more easily accomplished problems of mechanical safety. We can put up miles of guard rails and buy hard-boiled hats by the hundred, but one inactive or disinterested foreman or one careless employee can soon ruin the effect of all the safety devices on earth.

Understand that I do not condemn safety devices. In construction their use should be rigidly enforced wherever they are needed, but let us spend 75 per cent of our efforts on the human side where that percentage of our accidents occur.

I have, so far, covered the selection and training of employees—the latter being limited, due to the high labor turnover in construction, to the selling of the safety idea to the employee. My third and last point is supervision.

The day of the hard-boiled "pusher" is gone. He has been outclassed by the leader whose personality inspires confidence. The change is for the best. The crew who likes to work for a supervisor leaves the driven crew far behind in safety and efficiency. Perhaps some of the romance of construction has departed with the supervisor who rules with his "mailed fist" principle, but I can tell of dozens of terrible accidents that have occurred where men used their nerve instead of their brains. Several years ago a steel foreman, trying to "push" his crew to work on a cold morning, walked out on a frost-covered beam. His fall proved that his bravery was ignorance and the refusal of the crew, instead of being yellow, was wise. The modern construction supervisor is a business man who realizes that his job is to handle men and not material.

Clearness of orders and instructions is a big problem. Nicknames are often a cause of misunderstanding. I heard a story some time ago that might demonstrate my point. To block an object or wheel to keep it from rolling is called "chocking," "trigging," "checking" or "scotching" by different trades. A foreman on a large dam project told an employee to "check" a car of coal that was setting on a fairly steep grade. This employee misunderstood the order and, rather than show his ignorance to his superior, secured the car number. One-half hour later the air receiver leaked out and the car rolled over the end log of the spur track and down a 75-ft. embankment. Although no one was hurt, the use of the wrong word caused thousands of dollars damage. I do not think it necessary to dwell further on the potential hazard of misunderstood or misinterpreted orders. It has caused many accidents.

Everyone is vaguely disappointed in an address or paper on safety. He hopes that some day someone will be able to tell him exactly how to prevent accidents. If such a Utopia were possible, accidents would have been eliminated years ago. Accidents are the spectacular result of mistakes and will continue until these human errors are eliminated. Stop 40 per cent of the mistakes on a job and your accident record will improve by 30 per cent.

However, there are a few specific mechanical problems that happen often enough to warrant my mentioning. Neatness or good housekeeping is the first. Production and operating men know that neat plants are almost always profitable plants. The same is true of construction projects. Obtain plenty of yard room, pile material in good order—the contention that it will be gone next week is a poor alibi. Keep the job clean by piling scrap lumber and material in orderly piles. Keep good walkways and stairways. Do all of these things and, besides reducing accidents, you will speed up the movement of men and material to such an extent that you save far more than the cost of the good housekeeping. A neat job has no exposed nails or tripping hazards.

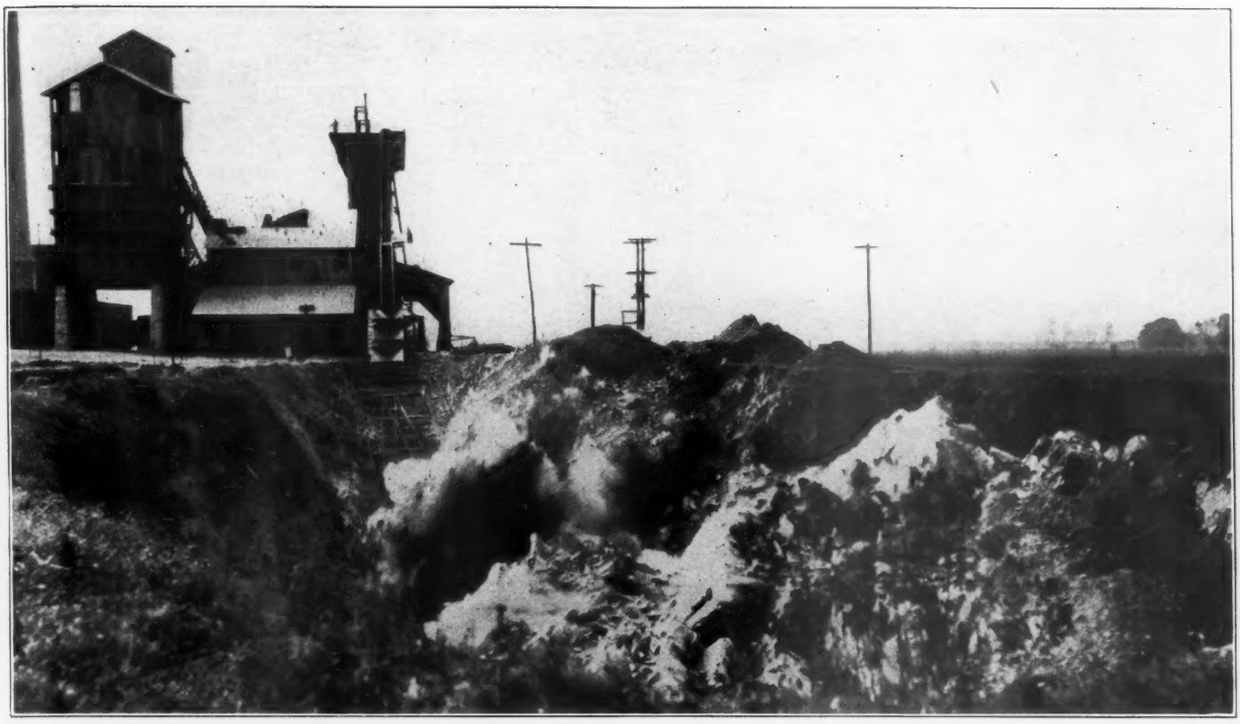
Recently on a large quarrying operation two men lost their lives by being crushed by rolling rock. It was found by investigation that these rocks, which were squared to approximately three feet, were placed in a rough pile where they were stored for transportation by cable way to the dam. By enlarging the storage space each rock was set down in a free position where it could be handled without disturbing other rock. The accident hazard was eliminated and the efficiency of transportation was increased.

Use guard rails or safety belts in high places. The unprotected man working at a dangerous height is obeying the first law of nature when he uses his right arm for his own safety and his left for his company.

Have a trained first-aid man on the job. Insist, in every safety meeting, that all small cuts and scratches have immediate first-aid treatment. Infection and blood poison take an amazing toll every year on construction work. The healthy suffer as much as the weak.

I have been informed that the cement industry has had a very large number of accidents in the re-construction of its mills. The prevention plan used with great success in the companies with which I am associated is:

1. Proper physical, mental and medical examination of all prospective employees.
2. Short, interesting safety meetings each week in which every job supervisor takes an active part.
3. Proper supervision, by leading instead of driving and by the elimination of all misunderstanding as to orders.
4. Use of good construction methods by which the physical hazards are reduced to a minimum.



One of the opening blasts in the quarry. Building next to kilns is crusher building with screening building at extreme left.

New Pennsylvania Plant Is Outstanding Development in Lime Industry

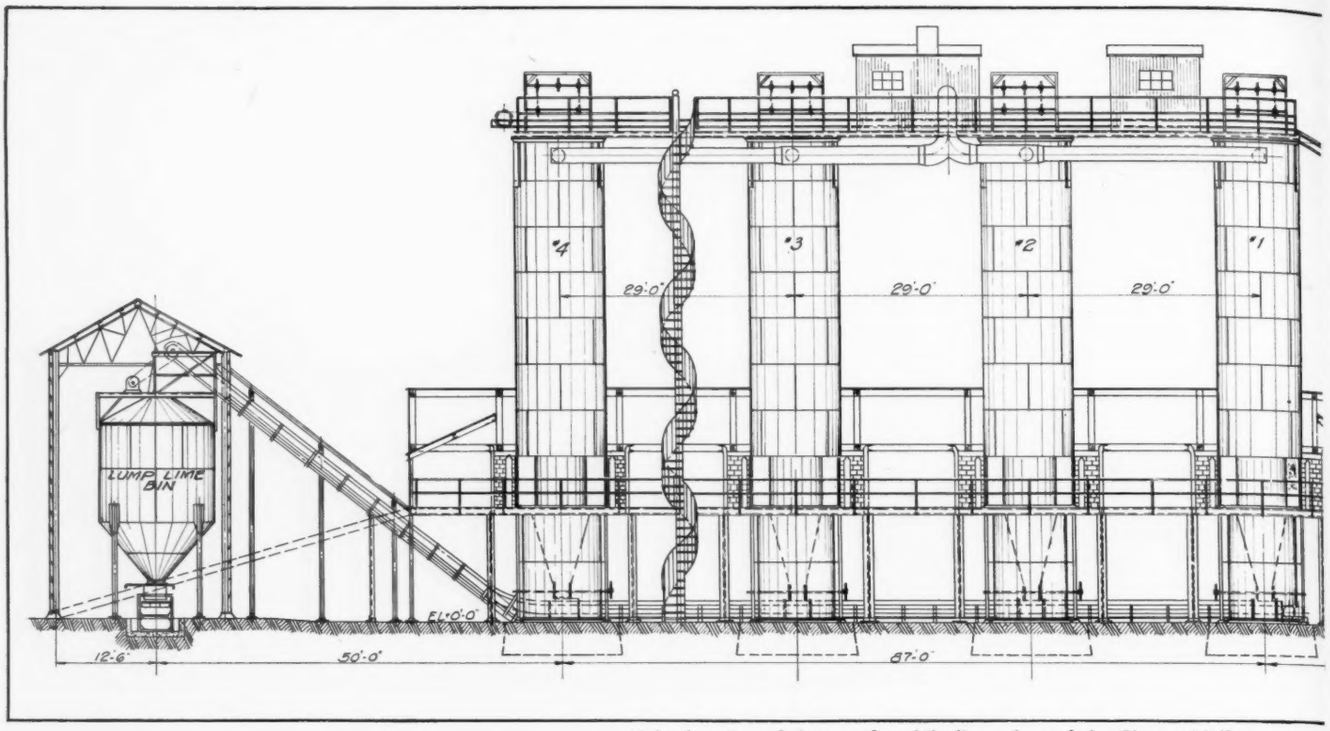
Self-Supporting Vertical Kilns Chief Feature of Chester Valley Operations

PERHAPS the most important recent development in the lime industry is the new plant of the Chester Valley Lime & Products Co. at Paoli, Pa., which went into full operation on December 10, 1930. It is a modern plant in every sense, being of concrete-and-steel construction throughout, and the most approved methods of operation are used. The plant was designed and built and lime was placed on the market inside of five months from the start which, in itself, is a remarkable record for a plant of this size and quality. Of interest also is the fact that the quarry was opened and the commercial-stone plant put into operation several months before the lime plant was completed so that, when this went into operation, a steady supply of the right kind of stone was available.

A testimonial to the quality of the lime produced is the fact that, within a month after the plant went into operation, enough orders were on hand to keep the plant in full operation for at least three months in advance. The entire output of the plant for 1931 has now been contracted for. The intention is to make this plant a year-round operation and, for that reason, enough kiln stone was stock-piled to carry through the winter months.

The plant was designed and erected and all machinery was installed by the McGann Mfg. Co. in coöperation with Charles Spellman, general manager of the lime company. Mr. Spellman, who has been associated with the manufacture of lime almost all his life and is recognized as one of the best practical lime men in the country, also selected the plant site and tested the property before it was acquired. Previous to his connection with this plant, he was plant manager of the Knickerbocker Lime Co. at Malvern, Pa., now owned by the Warner Co. C. W. Bixler, who has had wide experience in the erection of lime plants over this entire continent, was in charge of construction for the McGann Mfg. Co.

The property on which the plant is located consists of 169 acres of deposit at Paoli, Pa., about 20 miles west of Philadelphia. The overburden, averaging 10 ft. in depth, is removed by a General Excavator gasoline crane with a ½-cu. yd. clamshell bucket. The deposit is a rock ledge running east and west and inclined to the south at a pitch of from 55 to 60 deg. The entire property has been drilled and tested. The stone was found to be uniform and to contain very little silica, iron, or other impurity. It is one of the few deposits of high



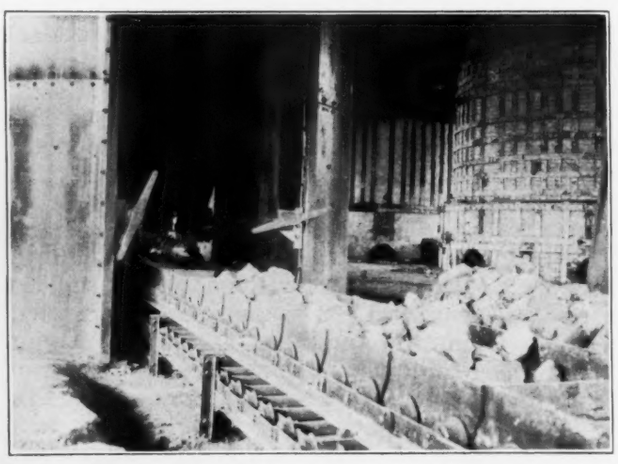
Side elevation of the new four-kiln lime plant of the Chester Valley

magnesia limestone in this country outside the Woodville-Gibsonburg district in Ohio. These features make it suitable not only for building lime and aggregate but for finishing lime as well.

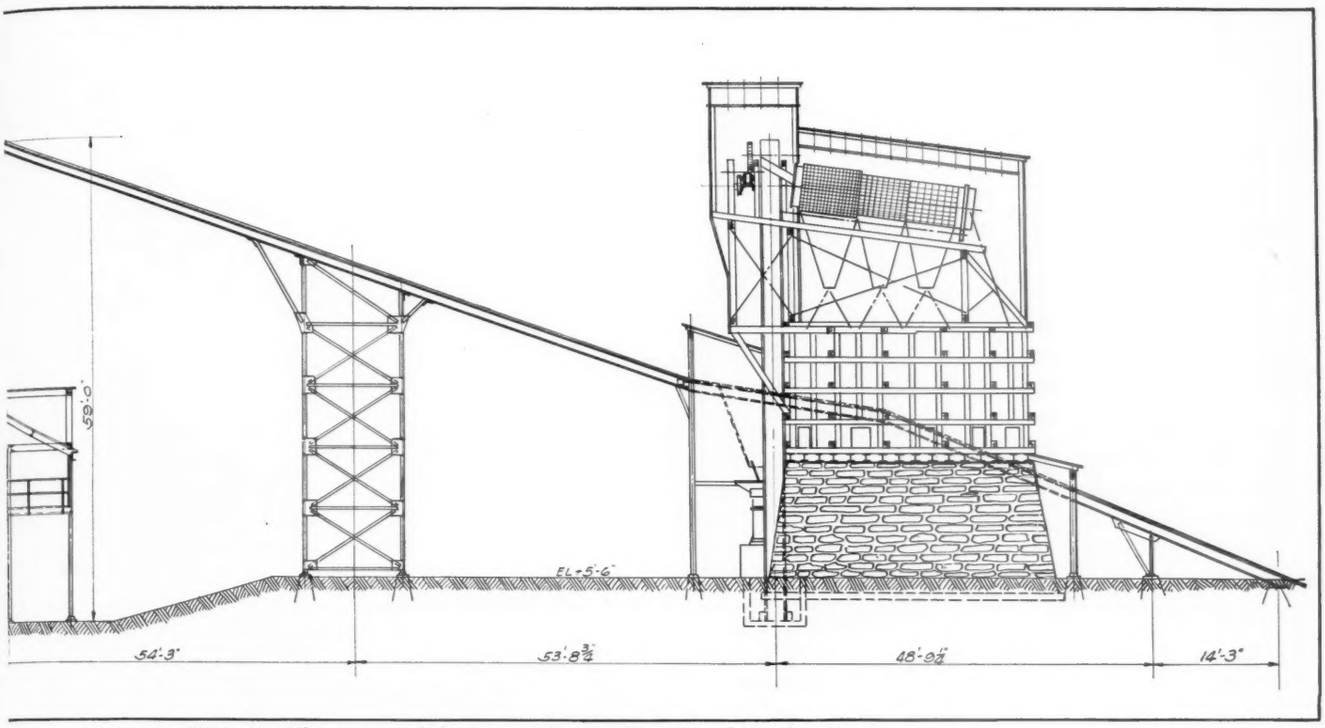
The quarry was opened, at a point just east of the plant, with an incline of about 30 deg., almost directly opposed to the inclination of the deposit. A first level of 35 feet is being opened now and, when this has been sufficiently enlarged, a second level of equal depth will be started. Drilling is done with Ingersoll-Rand Jackhamers, air for which is furnished by a Class ER-1 10-in. by 12-in. air compressor of the same make in the plant. Atlas 40-per cent dynamite and Cordeau-Bickford safety fuse are used. Stone is loaded by hand into 2-cu. yd.-capacity Easton steel side-dump quarry cars which are hauled up the incline three at a time by a Lidgerwood one-drum electric hoist on top of the kilns. The hoist is driven by a Westinghouse 60-hp. slip-ring motor.

When stone for the aggregate plant has been loaded, the cars are hauled part way up the incline to a platform where the incline flattens out to about 15 deg. The cars are dumped to a 12-cu. yd.-capacity timber surge bin which feeds, through a vertical rack-and-pinion gate, to the Austin No. 5 gyratory primary crusher. This discharges to a 24-in. belt bucket elevator on 58-ft. centers which feeds the Austin 6-ft. 2-in. by 22-ft. revolving sizing screen. The oversize, over 2¾ in., goes to the Traylor No. 4½ gyratory reduction crusher and to the same elevator back to the screen. The screen is 15 ft. above the bins and has a double spout for each size produced. This permits the storing of each size

Discharge end of the hydrator with beater mill at left and packer at right.



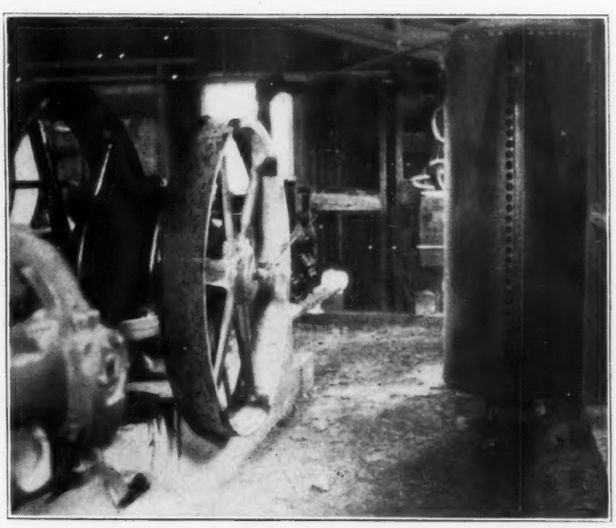
Pan conveyor which carries the lime from the kilns.



company. Note that kilns support their own weight as well as that of the charging floor.

separately or of any desired mixture of sizes. The five-compartment timber bin has a total capacity of 340 tons. Trucks are loaded through bottom discharge gates under the bins and cars through side gates. The stone is used mostly for aggregate and meets all specifications. The capacity of the aggregate plant is 60 tons per hour.

All equipment is electrically operated. Both crushers are belt-driven by a 75-hp. Westinghouse motor and the bucket elevator is chain-driven by



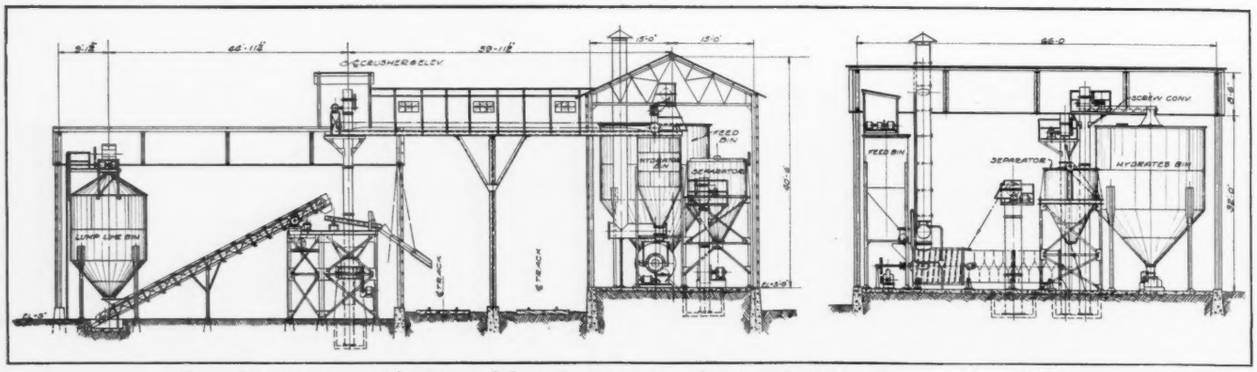
The compressor which furnishes air for quarry drilling.

a 25-hp. motor of the same make. The air compressor is belt-driven by a 60-hp. motor.

When the cars contain stone for the lime kilns they are hauled past this platform to the top of the kilns. The hoist is at the No. 1 kiln which is nearest the incline, while the back sheave is at No. 4. The charging track or floor is supported by the kilns and has a 5-per cent grade from kiln No. 1 to kiln No. 4 so that the empty cars are returned by gravity to the top of the incline from the quarry. The hoist operator dumps the cars. A spiral steel stairway provides a second means of access to the loading floor.

The four McGann York vertical self-supporting kilns are 60 ft. high above the draw-floor level with an outside diameter of 11 feet and are on 30-ft. centers. The burning chambers of each kiln are 5-ft. by 8-ft. and all have induced draft from a single Clarage 6-ft. fan. This fan is belt driven by a Westinghouse 20-hp. motor. A counterbalanced door, sealing the top of each kiln, allows accurate regulation of the draft. The kiln lining is of General Refractories and Harbison-Walker manufacture. The firing floor is 14 ft. above ground level, 23 ft. wide, and long enough to go around each end

Crane loading to truck. Charles Spellman, general manager at left, Charles Spellman, Jr., operating crane.



Lump-lime storage and loading at left, with end section of hydrate building. Cross-section at right.

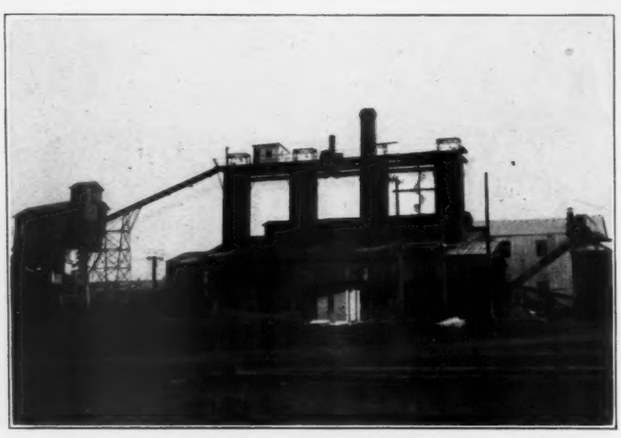
kiln. Soft coal is used for firing and forced draft from a Clarage 12-in. fan at the bottom of the grate in each kiln lengthens the flame for more efficient burning. Each of the forced draft fans is direct-driven by a General Electric 5-hp. motor.

The lime is drawn from the cooling chambers of the kilns through shear gates onto a Link-Belt 24-in. pan conveyor on 147-ft. 7-in. centers. As the drawing is done by the fireman from the firing floor this eliminates the necessity for a draw man. This conveyor is horizontal for 97 ft. and is then inclined for its remaining length at an angle of 35 deg. It discharges into a 14-ft.-diameter, 75-ton-capacity steel storage tank and is driven at the rate of 50 ft. per min. by a Westinghouse 10-hp. motor through a Link-Belt speed reducer and chain drive. The tank is completely enclosed for protection against the weather.

The storage tank discharges onto a Latimer 30-in. pan conveyor on 44-ft. 7-in. centers which is inclined 27 deg. This is driven at the rate of 50 ft. per min. by a Westinghouse 5-hp. motor through a James spur-gear speed reducer and chain. This is used as a picking table and discharges onto the McGann 4-ft. by 8-ft. single-deck shaking srceen. This screen is of the adjustable-throw type and is silent-chain-driven by a Westinghouse 7½-hp. motor.

The oversize, over 2½-in. in size, from the screen can be discharged through a chute to a box-car loader for loading cars when lump lime is desired. The car being loaded is on a track scale so that shipments can be accurately measured. When no lump lime is being loaded, one of the sections of screen cloth is taken out so that the material drops into a Pennsylvania 18-in. by 24-in. single-roll crusher. When lump lime is being loaded the fines from the screen go to the crusher in the same manner. The crusher is driven by a Westinghouse 15-hp. motor through a Cog Belt 4-strand drive and gears.

The crusher discharges to a McGann 10-in. steel-enclosed bucket elevator (No. 4) which, in turn, discharges to a Latimer 14-in. horizontal belt conveyor. This operates on 57-ft. centers, is enclosed in a corrugated-metal housing and is supported on a structural-steel framework with a clearance of 13 ft. above the loading track. The conveyor discharges into an 8-ft.-square, 20-ton-capacity steel storage tank in the hydrating building. This feeds through a rotary feeder to the McGann Schulthess



View from north showing self-supporting type of kilns used. Aggregate plant at left, hydrating plant in right background.

View in the quarry after one of the preliminary blasts. Note inclination of the rock strata.

No. 6 hydrator which has a rated capacity of 5 tons per hour. A bucket elevator (No. 1) on 37-ft. 3-in. centers takes the product to a Sturtevant 10-ft. air separator.

The rejections from the air separator discharge by gravity to the McGann 20-in. beater mill which, in turn, discharges through a 6-in. screw conveyor and an elevator (No. 3) on 25-ft. centers back into the hydrator. The finished hydrate from the air separator is taken by elevator No. 2 on 42-ft. 2-in. centers to a 12-in. screw conveyor which discharges

to a 100-ton-capacity steel storage tank. This tank is 20 ft. in diameter with an overall height of 30 ft. and is divided into two compartments so that one side can be filled while the other side feeds the Bates 4-bag packer.

Elevators Nos. 1, 2, 3 and 4 are driven by Westinghouse 5-hp. motors through Foote Bros. worm-gear speed reducers and chains. The 12-in. screw conveyor feeding from elevator No. 2 to the hydrate bin is chain-driven from the countershaft of the elevator. The Latimer horizontal conveyor is driven by a Westinghouse 2-hp. motor through a James spur-gear speed reducer and chain. The hydrator is driven by a Westinghouse 15-hp. motor through a Foote Bros. worm-gear speed reducer and drives the rotary hydrator feeder by chain. The air separator is belt-driven by a Westinghouse 15-hp. motor and the beater mill by a 10-hp. direct-connected motor of the same make. The 6-in. screw conveyor from the beater mill to elevator No. 3 is belt-driven from the beater-mill shaft. A 4-in. screw conveyor which takes the spill from the bagger back to elevator No. 2 is chain-driven from the foot shaft of the elevator.

Primary crusher discharging to elevator to screening plant.

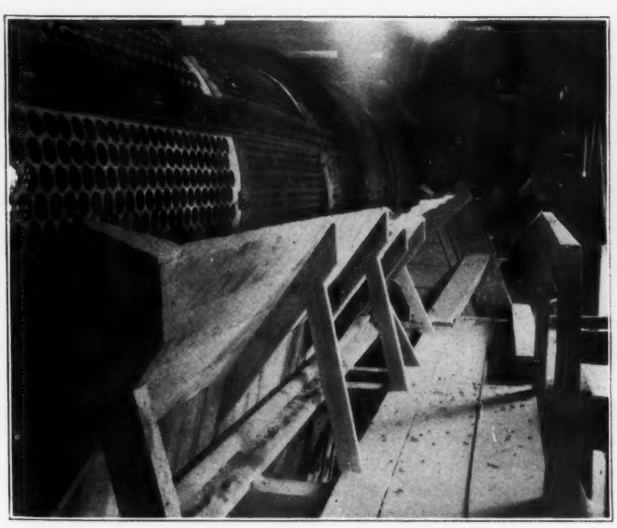
The quicklime storage tank, crusher and loader in foreground. Elevator and conveyor feed to hydrating plant.

One of the features of this plant is the small number of men required to keep it in full operation. Two hundred tons of crushed and sized stone and 75 tons of run-of-kiln lime are produced in a day and the hydrating plant has been averaging 80 tons per 24-hr. day. This is being done with an entire crew of only 25 men. The four kilns, which have a capacity of 18 tons each in 24 hours, require only two men for day operation and two at night. The lump-lime storage bin has ample capacity for all the lime that can be burned overnight so that all the other departments can be confined to daytime operation. The plant is also economical in power consumption. Only 354½ horsepower are required to operate the entire plant with the exception of the bagger, water pump and car loader.

Shipments are made over the Pennsylvania and the Reading Railways both of which are accessible by a sidetrack from the plant. Two storage tracks at the plant provide ample storage capacity for both empty and full cars. Gravity feed is used so that, after the empty cars are brought in, no switching is required until they are loaded for shipment.

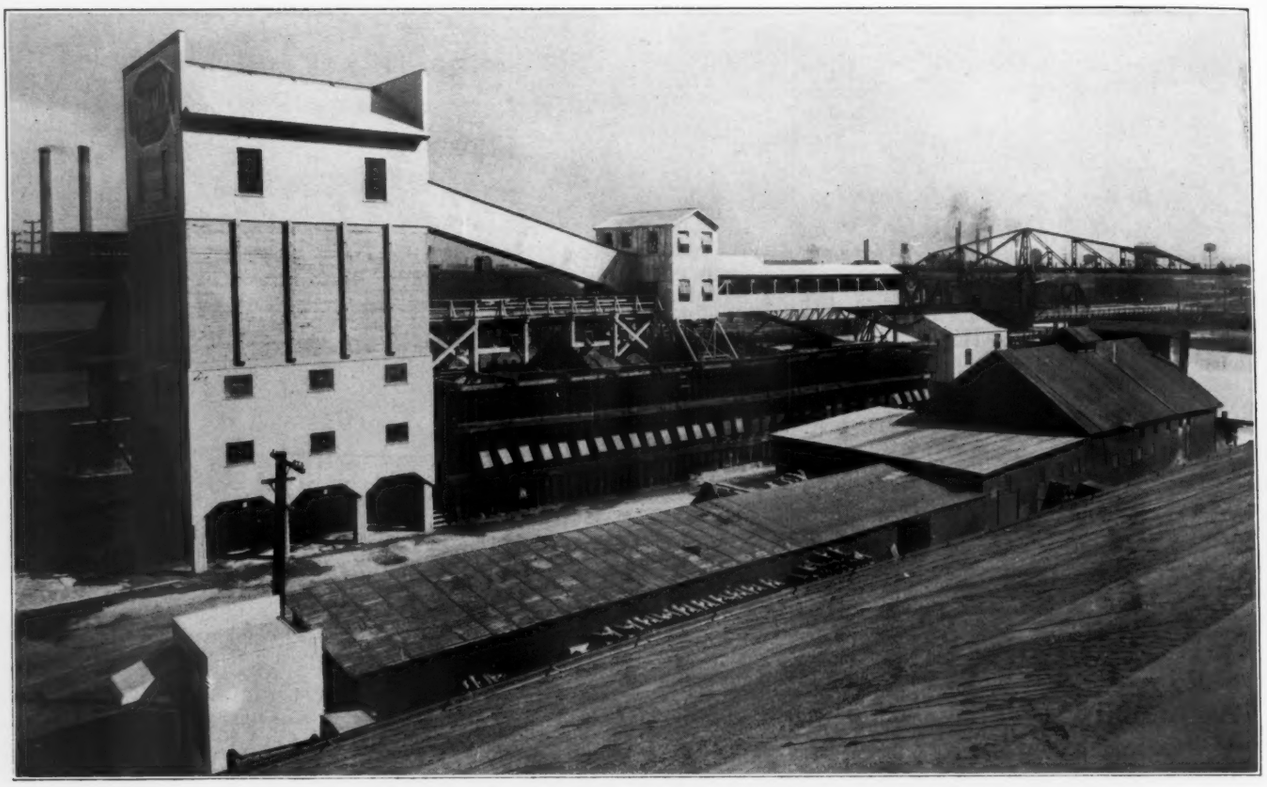
Most of the plant equipment except that otherwise described was furnished by the McGann Mfg. Co. This includes the kilns, hydrators, beater mill, storage tanks, elevators, screw conveyors, grating,

(Continued on page 61)



Revolving sizing screen; bucket elevator from crusher at right.

Stone feeding from surge bin to gyratory primary crusher.



Ready-mixed concrete plant from the southeast. Note compact, straight-line feed from dock to the mixing plant.

Barges Bring Aggregate to Ready-Mixed Concrete Plant at Tacoma

Reversible Bunker-Storage Belt Conveyor Aids Flexibility in Handling Materials

By CHAS. F. A. MANN

EARLY last year the Pioneer Sand & Gravel Co. of Seattle, Wash., acquired the holdings of the George Scofield Co. of Tacoma, Wash., for a price given as $400,000. The Scofield company was a pioneer Northwest building-materials-supply company, handling a wide range of standard building-material lines, besides retailing sand and gravel and a line of tiling made at the company's Tacoma plant. A large warehouse located on the shore of Lake Union, Seattle, was also operated by the company. Since the old firm of Savage-Scofield Co. was reorganized as the George Scofield Co., with the senior partner of the old firm, George Scofield, as owner and president, the company had been buying sand and gravel from the Pioneer Co.'s pits at Steilacoom and Maury Island. Thus the merging with these two large pioneer Northwest firms simply meant a closer affiliation.

Immediately after purchasing, the Pioneer company announced the proposed expenditure of $100,000 for a new gravel-and-sand plant and a concrete-mix plant that would embody the latest design and would rate as the fastest and most modern west of Chicago.

The George Scofield Co. continues to operate under the old name and occupies a site approximately 300 ft. by 300 ft., facing, on the northwest, the city waterway and, on the southwest, Dock St., along which road and rail shipping facilities lead to all parts of the city and to four main-line railroads. The concrete is sold under the trade name of Tru-Mix.

The plant occupies almost the exact center of the site, running from the waterway through to Dock St., where ample space is allowed for trucks to handle mixed concrete with speed.

Aggregate arrives at the plant on barges, principally from the Steilacoom pits of the Pioneer Sand & Gravel Co. and the Glacier Sand & Gravel Co., described in the March 12, March 26, and the January 1, 1930 issues of PIT AND QUARRY. The barges are unloaded by a specially designed hammerhead crane, patterned after the lumber cranes developed for lumber handling in the Northwest. This crane was designed by the Star Iron & Steel Co. of Tacoma, Wash., built at the company's shops on the Tidefiats, and then hauled over and reassembled where it now stands. The crane is supported on a

steel frame resting on capped piling driven to hardpan below the dock. The boom has a swing-radius of 65 ft. and is driven by two 50-hp. General Electric a.c. motors. The traveler handles a 2½-cu. yd. clamshell-type bucket, capable of handling from 60 to 70 cu. yd. of material per hour. It is equipped with flood-lights for night operation.

The clamshell bucket dumps the material into a steel hopper of 10-cu. yd. capacity, built into the frame of the crame. The material then drops onto a short conveyor feeder belt, traveling on a 10-ft. set of rolls. This belt is 24 in. wide and is driven by a 5-hp. General Electric motor, operating through a Falk reduction gear. It operates on a 10-deg. slope. Material then drops onto what is known as the B conveyor, 139 ft. long, traveling up a 15-deg. slope. This belt conveyor is driven by a 15-hp. General Electric motor, operating through an open gear, and conveys material to the storage tripper house. Here the material can be either directed onto a short belt running at right angles and carried to the bunker storage belt which travels on a steel carriage working along a pair of rails, or to the C belt which carries it to the bunkers above the concrete-mixing platform. Belt C is 87 ft. 9 in. long, travels up a 15-deg. slope, and is driven by a 15-hp. General Electric motor also through a simple, open-type reduction gear. The speed of these three conveyor belts varies from 290 to 320 ft. per min., the faster belts being on steeper slopes to avoid clogging and stalling when handling wet gravel.

One of the most interesting features of the plant is the ingeniously designed bunker-storage belt feeding from the tripper house at the end of the long conveyor B. This belt is 70 ft. long, and is of the shuttle type. It runs on a set of rolls built into a steel carriage on wheels, and travels over the top center of the main aggregate storage bins which are above a double-track rail line. Half of this carriage track is enclosed to afford protection for this belt when not in use. The belt is reversible, chain-driven through a double set of gearing, with double jaw clutches, and is operated by a 5-hp. General Electric motor. Material is dropped on the belt, either end of which may be spotted over any one of the bins, by the placing of the carriage. As said, the belt may be run in either direction to allow filling of bins at either end, the main feed being in the approximate center of the bin-storage system from the short right-angle belt that takes material in turn, from the main or B conveyor.

The conveyor system is of the three-roll, ball-bearing Rex-Stearns type, with Webster Brinkley fittings. All belting is of the heaviest duty type, being 7/16 in. thick and is the famous Maltese Cross brand, made by the Hewitt Gutta Percha Rubber Co.

During 1931 the company plans to rebuild the

Hammerhead crane with 65-ft. boom unloading aggregates from scows to plant storage.

The plant from the southwest showing trucks lined up in front of mixer.

4,000-cu. yd. storage-bin system, which is entirely separate and detached from the new conveyor layout. Underneath the storage plant will be a 228-ft. belt conveyor to carry the material back from the bottom of the storage bins and dump it on the lower end of belt B in order that it can be hauled directly to the concrete-mix plant.

Belt conveyor which handles aggregates from storage to mixing bunkers.

Material finally arriving at the top of the main concrete-mix house, which is 36 ft. square and 80 ft. high, is dumped by a specially designed steel bin and spout into any one of the seven steel-lined storage bins above the mix plant. These have a capacity of about 80 cu. yd. of material. The entire building is of heavy timber and steel I-beam construction. Beneath the bunkers is the dry-mix platform where the seven aggregate storage bins are connected by steel chutes with cut-offs to the pan scales above the concrete mixer.

This scale pan is part of the 5-ton Toledo dial scales for weighing aggregate and cement. The scales are compensated and the bottom of the pan is connected with a steel chute which drops materials directly into the 2-cu. yd. Rex chain-driven concrete mixer below. Cement, at present, is measured in a steel dump-cart, but, eventually, it will be handled by a conveyor belt in bulk to a storage bin and weighed out as is the aggregate now. A 65-gal. water tank, with a glass gauge and measuring scale is provided to the left of the operator's platform.

Distributing spouts over the seven aggregate bins.

The layout gives a very compact, fast plant. General Electric switches and pushbutton controls regulate the mixer below. A mixing chart for every type of concrete mix is rolled on a lacquered wooden drum and gives an instantly available reference for any type of concrete. This eliminates guesswork in complying with specifications. A Tagliabue Mixometer (originally designed by B. Parry of the Pioneer Co. in Seattle, subsequently sold to the Tagliabue Co. for manufacture and sales), provides the most accurate check known on the concrete inside the mixer before it is dumped. This Mixometer is hydraulically operated, records the density of the mix on a chart with inked pen, and tells the operator exactly how his mix is. From his chart on the cylindrical drum he can check instantly to see if he is mixing the order to specifications and any corrections can be made without delay.

The Rex mixer is driven by a dust-proof General Electric motor. All operating levers are mounted on frames and one man controls the entire opera-

(*Continued on page 61*)

Aggregates for Hydro-Electric Project Furnished by Complete Plant

Seattle Firm Erects Producing Unit on Site Two Miles Below Rock Island Dam

THIRTEEN miles below Wenatchee, on the Columbia River, in central Washington, a huge hydro-electric project known as the Rock Island dam is under construction. This $25,000,000 project belongs to the Washington Electric Co., a subsidiary of the Puget Sound Power & Light Co. It is being handled by the Stone & Webster Engineering Corp. of which W. D. Shannon is general superintendent. The personnel of this corporation's staff on this particular job includes: R. E. McGrew, superintendent of construction; L. C. McIver, accountant; M. M. Mason, job superintendent; John L. Cannon and W. H. Phillips, assistant job superintendents; D. M. Kinnell, night superintendent; T. T. Walsh, resident engineer; and F. T. Barry, purchasing agent.

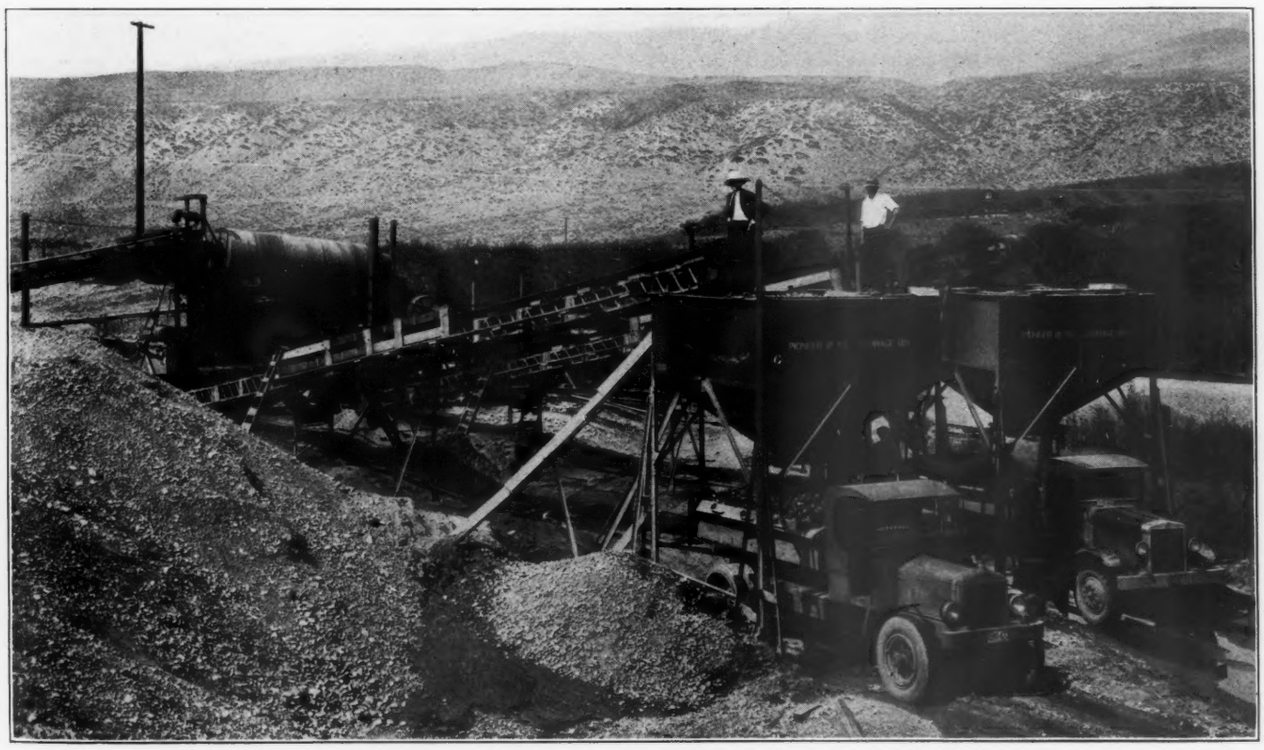
The L. Romano Engineering Corp., Seattle, Wash., is constructing the first unit which will develop 84,000 hp. The ultimate capacity to be developed is 240,000 hp.

Extensive prospecting by engineers disclosed a huge sand-and-gravel deposit within two miles of this dam-site and the contract for getting out and transporting the aggregate was given to the Romano corporation. This work was required to be expeditious, during the low-water period from September to April. The gravel deposit was deep. Its composition was approximately one-third sand and two-thirds rounded glacial boulders running from 3 in. to 6 in. in size.

The Romano engineers purchased the excavating, crushing, screening and washing equipment from the Pioneer Gravel Equipment Mfg. Co. of Minneapolis, Minn. The raw materials are excavated by a Northwest 1¼-cu. yd. shovel, now working more than thirty feet below the original surface of the deposit.

The sand and gravel are loaded into two Kenworth 4-cu. yd. trucks and hauled about 200 ft., up a 27-deg. grade, to a trap at the top of the field plant. From this trap or hopper, a plate feeder delivers the materials to a belt conveyor which, in turn, removes them 100 ft. to the scrubbing unit set immediately ahead of the 48-in.-diam. revolving screen. The finer materials which penetrate this screen are next classified by a shaker screen equipped with SKF bearings.

The oversize from the revolving screen is delivered to the crusher. After crushing, the stone is returned to the same screen. This assemblage of conveying, screening, washing and crushing equipment is known by the Pioneer Gravel Equipment



Field plant at the pit with trucks being loaded beneath the steel bins.

Aggregate stock-pile and concrete-mixing plant at the dam site.

Mfg. Co. as its 300 W complete plant. It has an average capacity of 1,400 cu. yd. of these raw materials per ten-hour day. The Romano engineers have reported that this plant handled 1,734 cu. yd. on a single shift.

All the aggregates, as prepared by this field plant, are taken by conveyors to two Pioneer 21-cu. yd. storage hoppers whence they are carried by a fleet of 5-ton trucks directly to the stock-piles near the concrete-mixing plant at the dam-site two miles distant. This fleet comprises twelve trucks equipped with Isaacson bodies and Heil hoists, and two trucks with Staley bodies and St. Paul hydraulic hoists. In addition to these fourteen trucks which are owned by the Romano corporation, the following eleven trucks are employed in the transport of aggregates from the field plant to the dam-site: one International, one Fageol, four Garfords, two Whites, two Pierce-Arrows—all of 5-cu. yd. capacities—and one 4-cu. yd. Sterling.

The Pioneer plant went into service July 1, last, and operated smoothly from the start.

At the dam-site the contractors have four Smith 1-cu. yd. concrete mixers which are operated day and night during concrete-pouring operations.

The Rock Island dam is about 4,400 ft. long overall. Its maximum height is about 109 ft. The pond level will be approximately 13 ft. below the top of the dam. The dam will be irregular in plan. Its north wing will flank the tracks of the Great Northern Ry. for some distance. It will then run south across the east channel of Columbia River until it meets the down-stream shore of Rock Island when it will curve with the contour of the island and continue across the west channel of the river.

The excavation of the dam was entirely in basalt or trap rock, and was done by sub-contract. Bucyrus-Erie and P & H Diesel shovels handled the broken rock into White 5-cu. yd. trucks.

All necessary grading was handled by the Stone & Webster organization, using a Lima 1½-cu. yd. crane, a Bucyrus 2-cu. yd. steam shovel, two Marion steam shovels and two Northwest cranes.

Air for drilling was supplied by Ingersoll-Rand, Chicago Pneumatic, and Sullivan compressors.

In addition to the dam itself, this project includes a power-house, 880 ft. long and 100 ft. wide, in the bed of the east channel below the dam. It will be flanked on one side by a wing wall and on the other side, by a spillway section. Spillways will be erected in both channels of the river, as integral parts of the dam close to the bottom. A site is provided in the plans of the dam for a future lock if river navigation should be authorized by the federal government.

Cement for all concrete is being furnished by the Superior Portland Cement Co. plant at Concrete, the Northwestern Portland Cement Co. plant at Grotto, and the Olympic Portland Cement Co. plant at Bellingham—all in Washington. Estimates place the ultimate requirements at 960,000 sacks, this being used almost entirely in bulk form. There will be approximately 250,000 cu. yd. of concrete in all the structures. Approximately seven million board feet of lumber will be used for forms, and there will be 160,000 lb. of conduit for the electric lines.

As bulk cement is received at the mixing plant, it is handled by bucket elevators into four storage silos, each of 4-carload capacity. These silos are of wooden construction with steel cone-shaped bottoms. Cement can flow also directly from the freight cars to a bucket elevator which takes it to a 132-bbl. steel bin above the mixers.

Aggregates are taken from the stock-piles by Link-Belt 24-in. conveyors on 189-ft. centers, up an 18-deg. slope, to the same point above the mixers and deposited in steel bins. Each of the four Smith mixers is equipped with Blaw-Knox weighing hoppers. The mixing plant has a daily capacity of 2,000 cu. yd. of concrete.

During the winter season there have been occa-

Truck unloading aggregates on storage pile near the dam.

sions when the preheating of water and aggregates was necessary. A wooden hopper was equipped with three tiers of 1½-in. steam pipes, spaced about two feet apart, from top to bottom. Aggregates were loaded into this bunker by a clamshell crane and heated to about 40 deg. F. before it dropped to the same Link-Belt conveyors previously mentioned. These conveyors are enclosed by a gallery. When the sand and gravel reached the bins, another set of heating pipes increased the temperature to about 50 deg. The mixing water was brought to a temperature of 140 deg. F. by live steam from two marine-type boilers.

Concrete is dumped from the mixers into 1-cu. yd. steel hoppers on cars that are hauled to the forms by Plymouth 8-ton locomotives. The hopper cars discharge the concrete into a hopper whence it is hoisted to a chute hopper and thence into the chutes that reach the forms. The concrete towers and chutes are carried on two gantry cranes.

It was necessary to build two of the largest fish ladders in the world to permit the migration of the salmon in their annual rush to the native spawning grounds higher up along the Columbia River and their contrary rush back to the sea. These ladders are 20 ft. wide and 60 ft. high.

The initial four units of the dam are expected to be completed by Aug. 1, 1932.

Tacoma Ready-Mixed Concrete Plant

(*Continued from page 58*)

tion from his platform, which is built with a projecting observation window to assist him in spotting the trucks. A fleet of 13 trucks is maintained by the company to distribute the mixed concrete. Sand and gravel are handled by weight, and a weigh batcher for small orders of sand and gravel will be installed on the operating platform.

The company was fortunate in securing the contract to furnish ready-mixed concrete for the new 500,000-bushel grain elevator at the port of Tacoma, as one of its first orders. This order involved a continuous pour lasting two weeks. The plant ran day and night without interruption until the last concrete was placed for the roof trusses—a proof of this plant's successful design.

New Pennsylvania Lime Plant

(*Continued from page 55*)

stairs, and all other steel work about the plant. All belt conveyors were furnished by the Link-Belt Co. except the picking conveyor which is of Latimer make. Speed reducers are used on all conveyor and elevator drives. The Latimer conveyors are driven through James spur-gear units, the draw

Left to right: C. W. Bixler and C. C. Fraser, superintendent and general manager, McGann Mfg. Co.; Charles Spellman, general manager; E. H. Shainline, superintendent; and Daniel Cornwell, timekeeper, of the Chester Valley Lime & Products Co.

conveyor by a Link-Belt herringbone unit, and all the elevators through Foote worm-gear reducers.

The main office of the Chester Valley Lime & Products Co. is at West Chester, Pa. Officers are: F. S. Wood, president and treasurer, and Charles Spellman, general manager. Ernest Shainline is plant superintendent, and Chas. Spellman, Jr., is assistant general manager.

Airplane photograph of the Long Beach plant which appears in the lower center of the picture. Business and residential district in background.

Quarries Rock on Catalina Island for Use of Builders on Mainland

Economical Production Permits Material to Compete With That Produced Locally

By THOMAS E. STIMSON, JR.

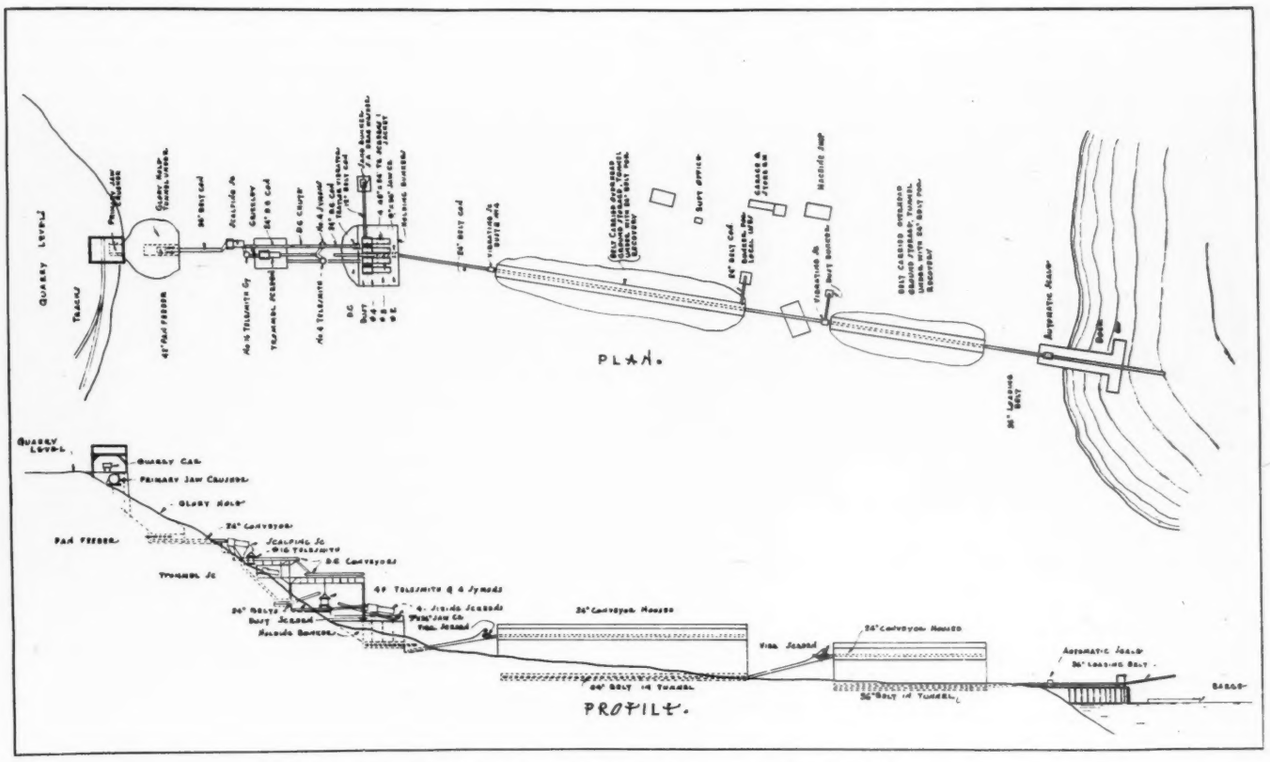
THROUGH the use of economical methods and a unique crushing plant built to operate cheaply over a long period of time, Graham Brothers, Inc., of Long Beach, Calif., is able to transport crushed rock across thirty miles of open ocean and sell it on a price basis in open competition with rock produced locally on the mainland. This is in spite of the fact that, in delivering the rock to a job, at least three major handlings of the material are involved as compared with only one handling that is needed to deliver locally-produced rock.

The Graham Brothers quarry and plant are located on Catalina Island. From there the rock is transported by barge to a distributing plant at Long Beach on the mainland. Deliveries to consumers are made by truck. The distributing plant serves more than a dozen cities and towns within a 15-mile radius, including Long Beach, Wilmington, San Pedro, Lomita, Torrence and Redondo. The cost of operating trucks for greater distances is such that price advantage is had by competing companies which produce local rock.

Catalina Island, the famed Magic Isle which William Wrigley, Jr., has developed into a pleasure resort, rises abruptly from the ocean, the hills coming right down to the shores. The Graham Brothers plant is on a hillside overlooking the sea. This has permitted a great use of gravity in handling the rock from the quarry floor, some 260 feet above sea-level, to the point where it is discharged from an overhanging conveyor belt into barges tied up to the dock. So much of the handling is accomplished by gravity that the load required for operating is only 788 hp., although the plant has a capacity of 3,000 tons of crushed rock a day.

The company does not operate an ocean fleet, the hauling of the rock to the Long Beach plant being done by the Wilmington Transportation Co. under contract. Two barges at a time, each carrying from 600 to 1,300 tons, are towed in series by a tug. The crossing requires from eight to ten hours, depending upon the load and weather conditions. The last mile of the trip is through heavy water traffic in a narrow channel and requires skillful handling. Up to 50,000 tons of material are brought to the mainland per month.

The rock is unloaded from the barges at the Long Beach distributing plant by means of a clamshell, the material being dumped into a hopper from which it is fed by a conveyor belt to a washing plant. Another belt carries the material from the washing plant to storage bunkers or to stock-piles. The storage bunkers have a capacity of 14,000 tons. Lack of room and difficulty of obtaining sufficient



Plan and profile of the plant at Graham Bros., Inc., Catalina Island quarry.

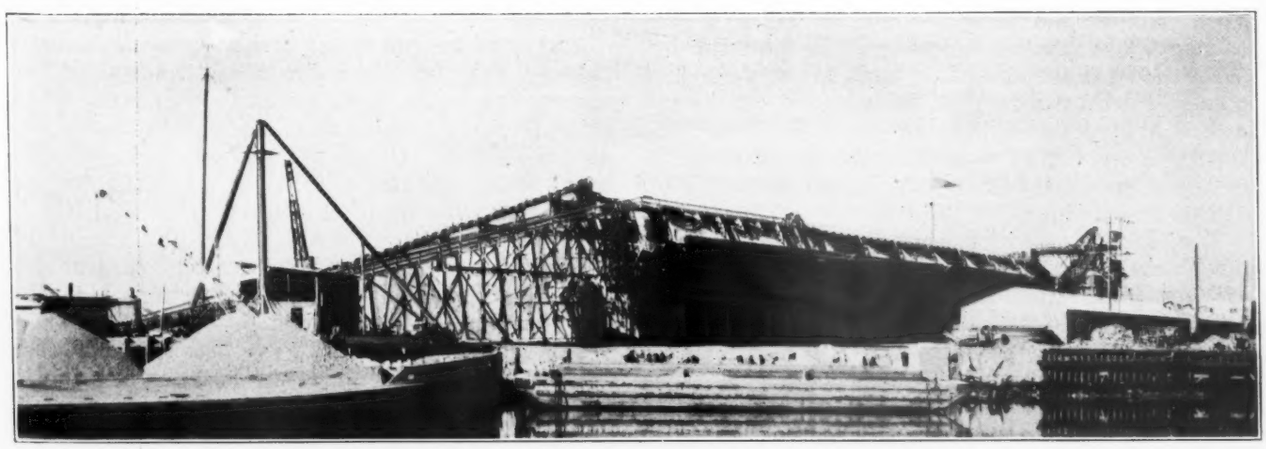
water on the island makes necessary the washing of the rock on the mainland.

The Catalina deposit is andesite, an igneous rock, and is located about one and one-half miles south of Avalon, the principal settlement on the island. Quarry operations have developed a face more than one-half mile long and some 500 feet high. Material in sight is practically unlimited. The rock is very hard, losing an average of only 12 per cent in the standard rattler test.

Quarrying is by the usual methods. All drilling except the well holes at the top of the quarry face is done with Cochise air drills, now being manufactured by Independent Pneumatic Tool Co., Chicago. Air is supplied from a plant consisting of one 12-in. by 10-in. and one 8-in. by 10-in. Chicago pneumatic compressors. Drills are sharpened in a modern shop equipped with an Ingersoll-Rand drill sharpener and heating furnace.

Material is loaded by two Marion Type 37 steam shovels traveling on standard-gauge track. Motive equipment consists of two 10-ton and one 8-ton Plymouth locomotives, and six 10-ton Lewellyn and four 6-cu. yd. Western dump cars. Rock is moved from the quarry to the primary breaker and is automatically dumped by a steel bail engaging the side of the car and lifted by a single-drum friction hoist. This hoist permits rapid or partial dumping of the load, depending upon the character of the rock.

The primary breaker is a 48-in. by 60-in. Traylor jaw crusher set to 8 in. and driven from a motor with a rope drive. This crusher is housed just under the level of the quarry floor. Each succeeding operation carries the rock to a lower level as it passes step by step through the plant.



Washing plant and storage facilities at Long Beach where the barges are unloaded after their 30-mile trip from the island.

The Catalina Island plant. The mountainside location permits gravity to do most of the work, thus keeping horsepower requirements low.

The crushed material from the primary crusher is discharged by gravity into an underlying glory-hole of 1,000-cu. yd. capacity which was blasted out of solid rock. This large storage capacity permits the plant to be operated independent of any temporary shut-downs in quarry operations. The material is fed from the glory-hole by means of a 42-in. Stephens-Adamson pan feeder onto a 36-in. S-A belt conveyor which discharges into a 60-in. by 16-ft. trommel scalping fitted with one jacket. All material passing the jacket is discharged onto a 24-in. belt conveyor in two lengths and is stored to be marketed as D. G. Seam material and quarry waste are also sold as D. G.

All material passing the inside jacket of the screen is by-passed around the secondary crusher, the over-size material being fed into the No. 16 Telsmith gyratory secondary crusher, set to a 2½-in. discharge opening. The product is discharged over a grizzly into a 48-in. by 16-ft. trommel fitted with one jacket. All material below the 2½-in. ring is separated in two sizes and is delivered by belts to holding bins further down the plant. At all stages, the small material is removed from the line as rapidly as possible, saving undue work by the crushers.

The oversize rock is then fed, by means of three 24-in. Stephens-Adamson conveyor belts to the third-stage crushers, to which all material by-passed around the secondary unit is also fed. The belts are arranged so that the material can be by-passed around this third stage when desired. The third-stage crushers consist of one No. 4 Telsmith gyratory and one 4-ft. Symons cone, set to 1¼-in. discharge openings.

The final separations are made by feeding through a bank of four 48-in. by 24-ft. trommels with one jacket each, the screens being fed in pairs. A Traylor vibrator is set at one side and the passing material is taken by a cross-belt to a Stephens-Adamson drag washer, the product being used locally on the island as sand.

A five-compartment bunker for the various sizes of crushed rock is located under the screens. Oversize material from the screens is returned by a 24-in. belt to a 9-in. by 36-in. Cedar Rapids jaw crusher. A tunnel underneath the holding bunkers allows the rock to be transported over a 24-in. belt conveyor to be raised for ground storage. A Leahy vibrating screen is installed in this incline to separate the dust and dirt. Local demand for crushed rock is met by delivering from this belt to a 24-in. cross-belt which conveys the material to an overhead bunker with five compartments. The ground storage pile is about 250 feet long.

A secondary storage pile, closer to the loading dock to facilitate loading, is arranged by reclaiming the material from ground storage by means of a 24-in. belt 560 ft. long, extending into a concrete tunnel under the storage pile, whence the material passes over a second Leahy vibrating screen to a second ground storage. The final conveying is accomplished with a 36-in. belt moving from a tunnel under the last pile and over a cantilever extension above the wharf, to discharge directly onto the barges. A Weightometer automatic scale on the wharf weighs the material as it passes.

All motors in the plant are of Fairbanks-Morse

Clam-shell unloading a barge at the Long Beach docks.

manufacture, the power being obtained from the local Avalon generating plant. The plant was built as a unit by the Stephens-Adamson Mfg. Co. Standardization has been carried out as much as possible, all drives for the different belts being interchangeable. In its original state, the capacity of the plant was much less than at present. Greater capacity was obtained by installing the bank of four screens for the final separation to replace one 48-in. by 16-ft. screen, which was, in effect, the bottleneck of the system. Other parts of the process were keyed to this greater capacity in the final screening by the speeding up of the conveyor belt units.

Breakdowns have been virtually eliminated and depreciation has been reduced by very careful routine maintenance, including inspections, by Jim Forrest, plant superintendent.

Graham Brothers, Inc., have become one of the leaders in the sand and crushed-rock industry in southern California during the last few years through the acquisition of various other sand and rock deposits surrounding Los Angeles.

Specialists in Technology of Concrete Hold Sessions at Milwaukee

American Concrete Institute, National and Wisconsin Products Men Convene

DURING the last week in February, 1931, the Schroeder Hotel, Milwaukee, Wis., was the common meeting point for many of this country's men who are prominent in the various industries that make or consume concrete.

On Monday and Tuesday there were joint sessions of the Concrete Masonry Assn. and the Wisconsin Concrete Products Assn. Most of the addresses during the four sessions covered selling and marketing problems. These were discussed by Henry Buchholz, Chicago Insulcrete Co., Franklin Park, Ill.; Harry H. Potts, Chicago, Ill.; Dan Servey, Haydite Mfrs. Assn., Kansas City, Mo.; Nolan Browne, Penniman Concrete & Material Co., Dallas, Tex.; H. M. Robinson, Underwriters Laboratories, Chicago, Ill.; Fred Munger, General Cement Products Co., Flint, Mich.; R. Marshall, Detroit, Mich.; A. V. Johnson, Ideal Cement Stone Co., Omaha, Neb., and Austin Crabbe, Cement Products Co., Davenport, Ia. Einar Christensen, Nat'l Building Units Corp., Philadelphia, Pa., and Herman Frauenfelder, Algonite Stone Mfg. Co., St. Louis, Mo., spoke upon the value of research in developing sales.

The Concrete Masonry Assn. elected the following officers: D. R. Collins, Adrian, Mich., president; Nolan Browne, Dallas, Tex. and Austin Crabbe, Davenport, Ia., vice-presidents; and Jack Franklin, secretary-treasurer. The Concrete Products Assn. elected: Arthur Sorenson, Racine, Wis., president; Arthur Devos, vice-president, and Jack Franklin, treasurer.

The 27th annual convention of the American Concrete Institute started Tuesday, while the above program was in progress. The first session was in the afternoon and Pres. Duff A. Abrams presided. The first number was a general discussion of three papers that had been published in recent issues of the Institute's *Journal:* "Admixtures and Workability of Concrete," by G. M. Williams, professor of civil engineering, University of Saskatchewan; "A Study of the Flow Table and the Slump Test," by George A. Smith and Sanford W. Benham, of the Johns-Manville research laboratories; and "A Study of Slump and Flow of Concrete," by Inge Lyse and W. R. Johnson, of the Portland Cement Assn.'s research laboratory.

Prof. S. C. Hollister, structural engineering department, Purdue University, spoke upon "Studies of Concrete Mixtures"; C. H. Jumper, U. S. Bureau of Standards, spoke upon "Waterproofings for Concrete"; and W. R. Johnson, now of Purdue University, discussed "Making and Placing Concrete for the Calderwood Tunnels."

Prof. Hollister, one of the Institute's vice-presidents, acted as chairman at the Tuesday evening session. Prof. Paul T. Norton, Jr., Virginia Polytechnic Institute, and Prof. Dan H. Pletta, University of South Dakota, presented a joint paper entitled "Permeability of Gravel Concrete." Synopses of three papers that were published recently in the *Journal* were given by their respective authors as follows: "Design and Control of Concrete for the Diablo Dam," by Herbert F. Faulkner and R. R. Hubbard, engineers for the City of Seattle; "Some Long-Time Tests of Concrete," by Prof. M. O. Withey, University of Wisconsin; and "Properties of Mass Concrete," by Prof. Raymond E. Davis and Prof. G. E. Troxell, University of California. F. R. McMillan, Portland Cement Assn., and R. B. Young, Hydro-Electric Power Commission of Ontario, presented a symposium on "The Durability of Concrete."

At the Wednesday forenoon session, at which D. R. Collins, president of the Concrete Masonry Assn. presided, the following papers were presented. P. M. Woodworth, Portland Cement Assn., spoke on "Tests on Shrinkage of Concrete Masonry." He recommended the exclusive use of thoroughly air-dried units to minimize alternate shrinkage and expansion of cement-block masonry. Benjamin Wilk, general manager of Standard Building Products Co., Detroit, Mich., gave a synopsis of his paper "Continuous Versus Batch Mixers," which had been published in the *Journal.* W. D. M. Allan, as chairman of Committee 408, reported on the proposed "Recommended Practice for the Use of Color in Trowled Concrete Surfaces." Reports for other committees were: "Concrete Masonry Units," Committee 708, by Chairman P. M. Woodworth;

Left to right—S. C. Hollister, vice-president; Duff Abrams, president; and Harvey Whipple, secretary-treasurer of the American Concrete Institute for 1931. ("Milwaukee Journal" photo.)

"Cast-Stone Standards," Committee 704, Fred Weigel and C. G. Walker; and "Concrete Burial Vaults," Committee 709, by C. A. Weipking.

T. Chalkley Hatton, president of the Engineers' Society of Milwaukee, presided at the Wednesday afternoon session. T. C. Thee, U. S. Bureau of Public Roads; A. L. Hambrecht, of the Wisconsin State Highway Commission, and George W. Langley, county engineer of Sheboygan County, Wisconsin, participated in a discussion of the field practices during the construction of two highways in the latter's county. Prof. Emory D. Roberts, Marquette University, Milwaukee, explained a device that was used on these same jobs for "Determining the Characteristics of the Concrete While in the Mixer." As chairman of Committee 602, Frank I. Ginsburg, of the H. O. Penn Mchy. Co., New York, N. Y., reported on the "Design and Operation of Central Mixing Plants"; and as chairman of Committee 504, Miles N. Clair, reported on the proposed "Specifications for Ready-Mixed Concrete."

The annual dinner, held Wednesday evening in the ball-room of the hotel, was attended by about four hundred women and men. This affair was in coöperation with the Engineers' Society of Milwaukee and the Associated General Contractors of Milwaukee. Mr. Hatton of the former society was toastmaster. He first introduced Pres. Duff A. Abrams who gave a brief history of the Institute and recalled that a similar convention was held in Milwaukee just one-quarter century ago. He stated that the Institute has approximately 2,700 members. He next presented to I. E. Burks the Leonard C. Wasson medal, which is awarded annually, "for the most meritorious paper presented at the last convention." Mr. Burks' paper in 1930 was upon "Concreting Methods at the Chute à Caron Dam." In his address entitled "Opportunities of Transportation," Col. Carl R. Gray, Jr., general manager, C., St. P., M. & O. R. R., stressed the undue regulations placed by state and federal legislation upon railroads.

Excellent musical numbers were given by numerous Milwaukee artists, and a chalk talk in colors by "Bockewitz," a graduate student at the Chicago Art Institute, completed the program. Dancing followed.

A. E. Lindau, past president of the Institute, presided at the Thursday forenoon session. The program comprised reports on the progress of work by various standing committees.

Professors Raymond E. Davis and Harmer E. Davis, of the department of civil engineering, University of California, reported for Committee 109 on the "Flow of Concrete Under the Action of Sustained Loads." Albert Smith, chairman of Committee 308, reported on the "Design of Concrete Building for Hurricane Exposure." Professors W. A. Slater and F. E. Richart, presented the second progress report for Committee 105, on "Reinforced Concrete Column Investigations" at Lehigh and Illinois Universities. Arthur R. Lord, chairman of Committee 502, submitted a "Tentative Construction Specification for Concrete Work on Ordinary Buildings"; and William F. Zabriskie, chairman, presented for the same committee, a proposed "Specification of Supplying, Fabricating and Setting Reinforcing Steel on Ordinary Buildings." Mr. Lord reported also for Committee 506 on the proposed "Construction Specification for Concrete Work on the Small Job."

Mr. Lord presided at the Thursday afternoon or final session. The tellers reported that the members of the Institute had re-elected the administrative officials for the coming year. By this action Prof. Duff A. Abrams continues as president, Prof. S. C. Hollister and Arthur R. Lord continue as vice-presidents, while Harvey Whipple is retained as secretary-treasurer.

After a brief address by Pres. Abrams, a general discussion was held on light-weight aggregates and concrete. Einar Christensen reported for Committee 203 on the "Use of Cinders as Concrete Aggregate"; George E. McIntyre reported for Committee 204 on "Burned Clay and Shale Aggregates"; Professors F. E. Richart and V. P. Jensen, department of theoretical and applied mechanics, University of Illinois, gave synopses of papers upon "Construction and Design Features of Haydite Concrete" and "Tests of Bonding Floor Finish to Slabs of Haydite and Gravel Concrete"; and Frank A. Randall reported for Committee 406 on the "Use of Light-Weight Concrete in Buildings."

"Unusual Features in the Design and Construction of a 20,000,000-Gallon Reservoir" was the title of a paper read by Arthur B. Morrill, of the Detroit Department of Water Supply.

The concluding number of the convention was a report for Committee 607, by Herbert Coffman, on "The Use of Cement in Bulk."

Although no session dealt exclusively with ready-mixed or mixed-in-transit concrete, numerous operators who prepare such material attended the convention to obtain suggestions about specifications for, and the best technique in furnishing, made-to-order concrete commercially.

Much interest attached to this convention because of the fact that Milwaukee possesses numerous concrete and concrete-products plants as well as large plants for the manufacture of concrete equipment. Delegates and guests being invited to inspect any of these plants, trips were made both forenoons and afternoons on Wednesday and Thursday. The following manufacturers threw their plants open to such inspections: Allis-Chalmers Mfg. Co., Bucyrus-Erie Co., Butler Bin Co., Chain Belt Co., C. H. & E. Mfg. Co., Harnischfeger Corp., Koehring Co., Nordberg Mfg. Co., A. O. Smith, T. L. Smith, Sterling Motor Truck Co., and Cutler-Hammer Co.

The convention committee deserves special mention for its splendid conduct of this meeting. K. H. Talbot was chairman of the committee, with H. L. Foster vice-chairman and B. E. Brevik, secretary. The registration list included approximately six hundred, including the feminine guests.

Aërial view of enlarged plant of Keystone Portland Cement Co. Incline from quarry is in left foreground.

Cement-Mill Expansion Program Reflects Vision of Designing Engineers

Enlargement at Keystone Plant Proceeds With Practically No Production Delays

By W. E. TRAUFFER

IN recent years it has become common practice to design a new cement plant with provisions for speedy and economical enlargement. Space is left for all additional equipment which will be necessary and the expansion can be made with little, if any, interference to the operation of the original equipment. Due in part to the comparatively recent development of this type of plant but probably more because of the current over-production in the industry which has curtailed expansion, few plants of this type have ever been enlarged. Enlargements of older plants, where no adequate provisions were made for future expansion, have been numerous in the past and have generally resulted in cumbersome plants, the very complexity of which made efficient and economical production of cement almost impossible.

The plant of the Keystone Portland Cement Co. at Bath, Pa., which went into operation in July, 1928, at that time created considerable interest because of the unusually extensive provisions made for future expansion. The original plant was a two-kiln operation and had a capacity of 3,300 bbl. per day. Almost immediately after the first unit went into operation construction was begun on a second unit of equal capacity. Because of the design it was possible to build this unit without interference to production and without tearing down any part of the original plant. The addition was completed in June, 1929, and the present 6,600-bbl.-capacity plant put into full operation. The plant, however, has not yet reached its limit of expansion. Ample space remains for the installation of a fifth kiln and its attendant mills.

The major changes necessitated by this expansion were: the enlargement of the stone storage and the installation of a second overhead traveling crane; the addition of two raw- and two finish-grinding mills; the construction of additional slurry silos; the installation of two new kilns and stacks; enlargement of the coal-pulverizing plant; and the construction of additional cement storage silos and packhouses. Other minor additions, mostly of conveying equipment, were also made. The crusher, mill, and kiln buildings also had to be somewhat enlarged.

Since the plant enlargement was completed a number of other changes were made. The quarry-haulage system was changed to meet the new conditions imposed by the deepening of the quarry. The original crushing equipment was replaced with two crushers which will easily handle the present production and any possible future increase. Combined mechanical-and-air agitation of slurry replaced the former system of air agitation. Another interesting development was the installation of a type of slurry-feed control new to the cement industry. The installation of these various units was accomplished without interference to regular operation. An ample supply of stone prepared in ad-

One end of the quarry showing shovel loading to cars.

vance easily carried the plant over the period when the crushing plant was shut down for the installation of new machinery. All of these changes are treated in detail in this article.

The plant layout, for the reasons given in the opening paragraph, is unusually simple and compact for a plant of this size, but is more or less along conventional lines. The design centers about the storage building where the stone, gypsum, clinker and coal are stored. All the buildings that house equipment for processing any of these materials adjoin it on one side and are perpendicular to it. The raw mills, for example, are opposite the stone storage, the discharge ends of the kilns and the finish mills are opposite the clinker storage, the coal mill is opposite the coal storage, and the slurry silos are between the raw mills and the feed ends of the kilns.

These features contribute to the economy of operation of the plant because of the short distance any of the materials have to be transferred and the minimum amount of rehandling required. The storage and packing facilities are also unusually complete and flexible. Another feature is that all the raw material required excepting, of course, the gypsum, is obtained from one quarry. In common with most other modern cement plants, concrete is used wherever possible in its construction. With a few exceptions, all buildings have a structural steel framework covered with corrugated cement-asbestos. The large number of dust collectors installed in the plant keep it unusually clean and dustless.

The large and particular style of grinding mills employed are of such a nature that they will grind economically, so that 92 per cent will pass a sieve having 40,000 openings per sq. in. This fine grinding of both the raw material and the finished cement, together with the unusual features employed in controlling the mixing and agitation of the slurry, allows a uniform product at all times.

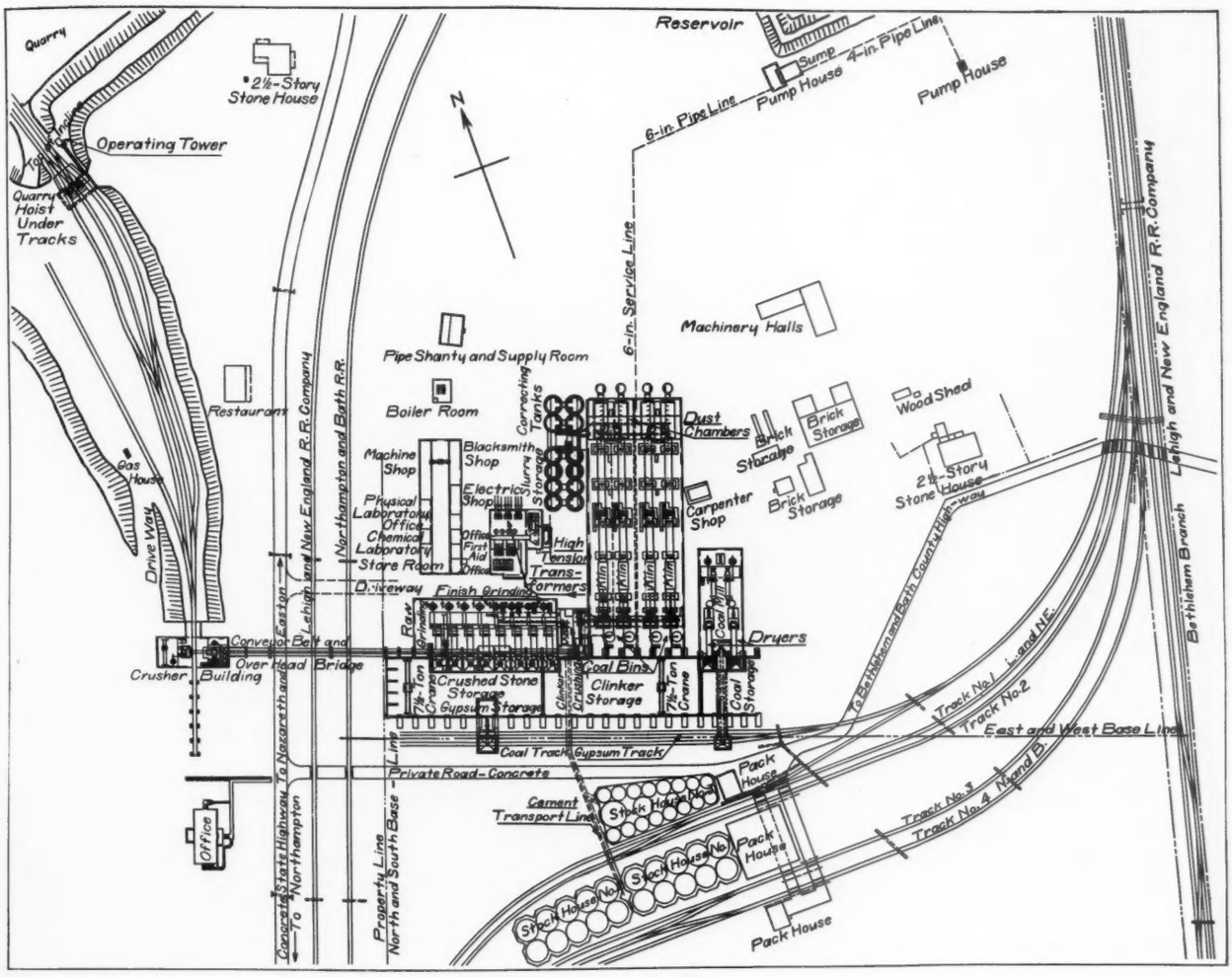
The large number of super-synchronous motors employed gives a good power factor at all times and the large type of various manufacturing units installed uses the minimum amount of electrical energy per barrel of cement produced. From a labor standpoint the plant appears to be able to operate very efficiently, as the number of man-hours per barrel of cement produced was less than 0.3 for the past year.

The disappearing-top barney hauling a carload of stone up the incline to the plant.

The deposit is the Lehigh Valley cement rock common to this district and has a dip of 45 deg. to the northwest. The top 75 ft. of the deposit is low in calcium content. This is underlaid by 150 ft. of high-calcium rock and this, in turn, by 500 ft. or more of low-calcium rock. This condition made it necessary, when the quarry was first opened, to get some high-calcium stone from outside sources. As the quarry was deepened and enlarged, however, the high-calcium stone soon became available and this practice was discontinued. The quarry product now is practically the correct composition for the manufacture of high-grade Portland cement and does not require the addition of any other materials. Typical analyses of the high and low limestones are given below:

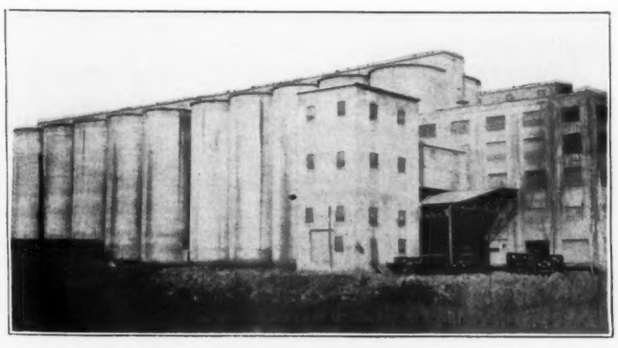
	High-Calcium Stone	Low-Calcium Stone
SiO	6.72	13.08
R_2O_3	5.10	7.73
$CaCO_3$	83.80	75.60
$MgCO_3$	2.95	3.75

One of the electric well drills in the quarry.



Plan of the completed plant of the Keystone Portland Cement Co. with quarry in the upper left-hand corner. Note unusually compact design for a plant of 6,600-bbl. capacity per day.

In the two and one-half years since the plant went into operation the quarry has been considerably deepened and enlarged. The level is now about 100 ft. below the surface and the working face is about 400 ft. long. At one extremity the level has been lowered another 25 ft. and this will be continued until a second 100-ft. level is reached. Drilling is done by two Sanderson Cyclone 6-in. electric well drills. Blasting is done with single or double-row bank shots of from 15 to 20 holes each. Forty- and 60-per cent dynamite and Cordeau-Bickford safety fuse are used. Ingersoll-Rand Jackhamers are used for secondary drilling. As the overburden was removed from a considerable portion of the deposit when the quarry was opened no stripping will be necessary for some time.

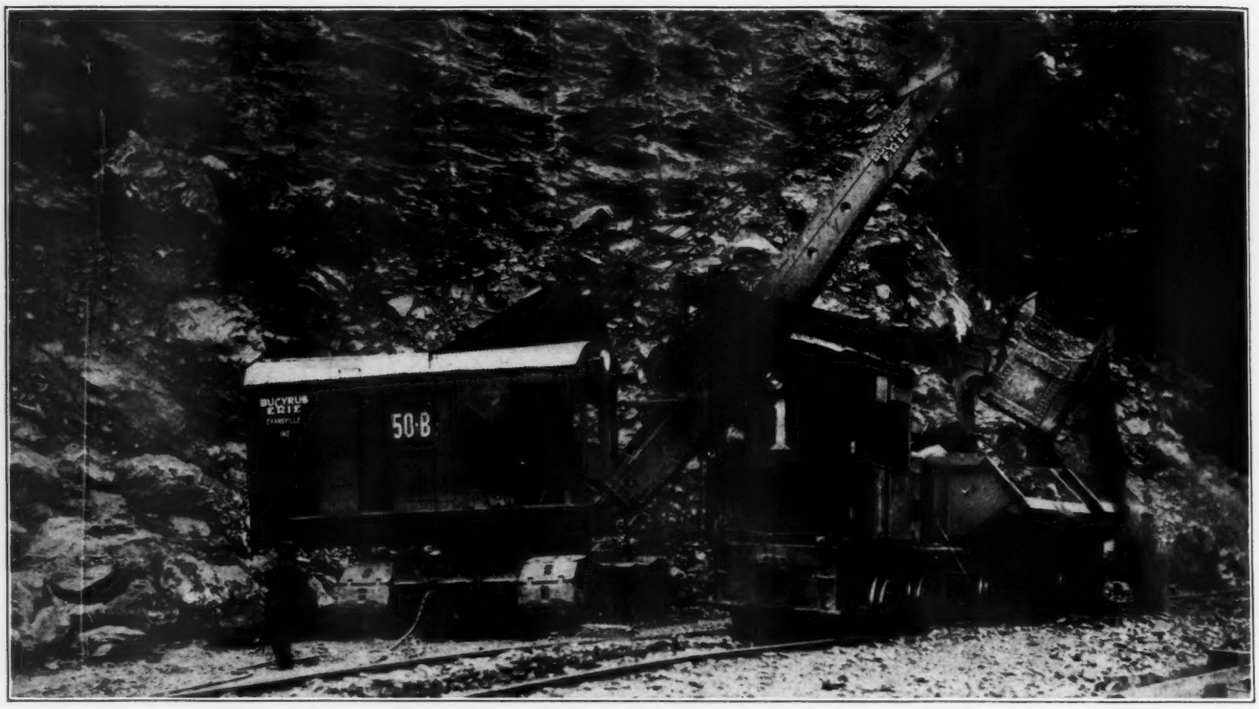


A view showing some of the silos with packhouses No. 1 and No. 3 at the right.

The stone is loaded by two Bucyrus-Erie Model 50B electric shovels with 1¾-cu. yd. dippers into 20 Easton 10-ton-capacity Phoenix steel quarry cars. These were formerly hauled to the plant by two Whitcomb 16-ton gasoline locomotives. As the quarry was deepened, however, the incline from the quarry to the plant had to be lengthened and curves put in. It was finally decided to put in a hoisting system and this went into operation during the summer of 1930.

The two locomotives now haul the cars to the foot of the incline which has a slope of 30 deg. It is a double-track incline of the balanced type and each track has a Vulcan Iron Works disappearing-top barney attached to cables. These push the cars up the incline one at a time to a point where the grade is slightly away from the quarry to insure against their running wild back into the quarry. The barney, on its return trip, takes an empty car back into the quarry.

The barneys are operated by cables which run

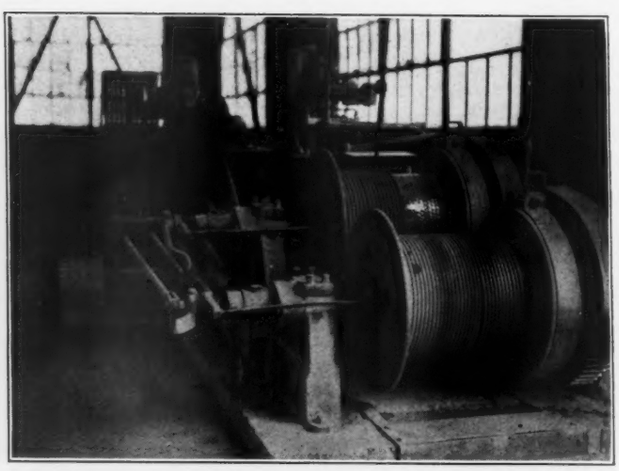


Close-up view of one of the electric shovels loading cars in the quarry.

underground from the top of the incline to a Flory 2-drum hoist in a concrete building under the track fill about 100 ft. back from the top of the incline. This hoist has an 18,000-lb. pull at 600 f.p.m. hoisting speed and is driven by a 250-hp. motor. Hoisting operations are controlled from a small concrete house at the top of the incline.

A third Whitcomb 16-ton gasoline locomotive takes the cars the 1,000 ft. from the quarry to the crusher building. Here they are spotted and dumped by a Flory 2-drum hoist driven by a 20-hp. motor. The trestle from which the cars are dumped extends considerably beyond the building and allows ample storage for ten cars of stone. A 15-ton Box overhead traveling crane handles all repairs to the major machinery in this building.

The stone discharges to a hopper from which it feeds to the Pennsylvania 36-in. by 60-in. single-roll primary crusher. This reduces the stone to 10 in. and under and feeds to a short, inclined pan conveyor. This discharges to the Pennsylvania SXT-14 Super-Thor swing-hammer mill which reduces the stone to 1½-in. size and under. The roll crusher is driven by a 300-hp. Westinghouse induction motor through a multiple-strand V-belt drive, the pan conveyor by a 15-hp. motor through a speed reducer and the hammermill by a 500-hp. General Electric induction motor. A five-unit Norblo dust-collecting system makes this building practically dustless. When the lugs of the slugger-roll primary crusher wear down they are rebuilt by welding and Stelliting the surface.



The 2-drum hoist which spots cars and dumps them into the primary crusher.

The hammermill discharges to a 36-in. inclined belt conveyor on 355-ft. centers which is inclosed and crosses the state highway and several railroad tracks to the raw-material storage building. It becomes horizontal on reaching the storage and discharges by means of a movable tripper into any desired part of the stone storage or into any of the raw mill feed bins which are in a row along the side of the storage and below the conveyor. The conveyor is driven by a 40-hp. motor through a speed reducer.

The storage is now 80 ft. wide by 534 ft. long and is divided by concrete partition walls into separate storage sections for stone, clinker and coal. The clinker-storage section is 220 ft. long with a capacity of 185,000 bbl.; the coal section is 80 ft. long with a capacity of 10,700 tons; and the stone section is 234 ft. long with a capacity of 27,450 tons each of high- and low-calcium stone. The latter section was extended 34 ft. when the plant was enlarged, to take care of the increased capacity. Gypsum is stored in a 22-ft. by 24-ft. concrete-walled compartment in a corner of the stone storage section.

All rehandling of any of these materials to or from storage is done by two 6½-ton Shepard overhead traveling cranes each handling a 2½-cu. yd. Hayward clam-shell bucket.

The four steel raw-mill feed bins have a capacity of 400 tons each and feed by 72-in. table feeders into the four Polysius 7-ft. by 42-ft., 8-in. three-compartment Solo mills. These are in the same building with the four Solo finish-grinding mills which are of the same size and are driven in the same manner as the raw mills. Each mill is direct-driven by a 700-hp. Type TSR General Electric supersynchronous motor. Each of the raw-mill feeders is driven by a 5-hp. d. c. motor. This building is served by four 8-section dust collectors each of which has a 56-in. fan driven by a 25-hp. motor.

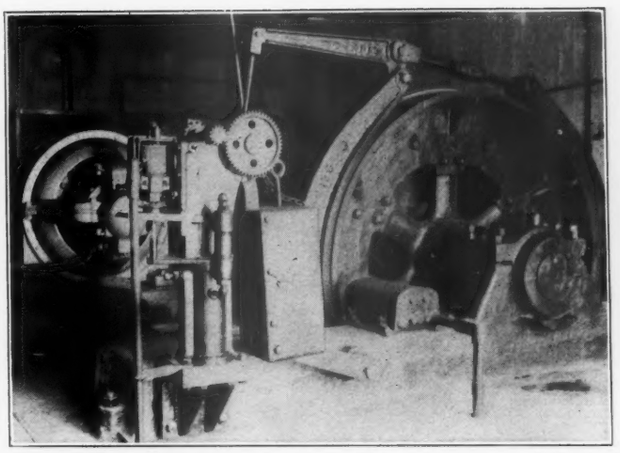
The slurry, which has a water content of about 37 per cent, is chuted from the raw mill discharge to a concrete pit which feeds by gravity to four pairs of 27-cu. ft. capacity Pressors. These are a special type of air-lift pump and each pair will handle slurry at the rate of 90 bbl. per hour. They pump the slurry into eight concrete slurry tanks 20 ft. in diameter by 45 ft. high with a capacity of

Plant view from the south with silos at left and storage and kiln buildings at right.

1,120 bbl. each. These are known as the mill-run tanks. Slurry is drained from these by gravity in the desired proportions to a concrete pit from which two sets of Pressors pump to four concrete correction tanks. These are 24 ft. in diam. by 45 ft. high and have a capacity of 1,616 bbl. each. Each of the twelve tanks has a Bethlehem Foundry & Machine Co. mechanical and Polysius air agitator all of which are driven by 7½-hp. motors through Palmer-Bee speed reducers.

All twelve tanks are of the silo type and are built entirely above the ground. The tops of the silos are extended and roofed over to form a building which incloses the slurry agitation machinery and the pit in which the slurry pumps are located. The slurry-correction tanks drain to a large concrete pit from which a 6-in. Wilfley pump feeds to the kiln-feed tanks. A single Pressor is used as an auxiliary. The Wilfley pump is driven by a 100-hp. motor.

The four steel kiln-feed tanks are mounted over the kilns and are 9 ft. in diameter by 10 ft. high. Each has a Bethlehem mechanical and Polysius air agitator driven by a 5-hp. motor through a DeLaval worm-gear speed reducer. The tanks discharge by gravity to four ferris-wheel-type slurry feeders which are driven and controlled in an unusual manner. The type of control used keeps the rate of slurry feed in direct proportion to the kiln speed and puts the control of this ratio entirely into the hands of the plant chemist.

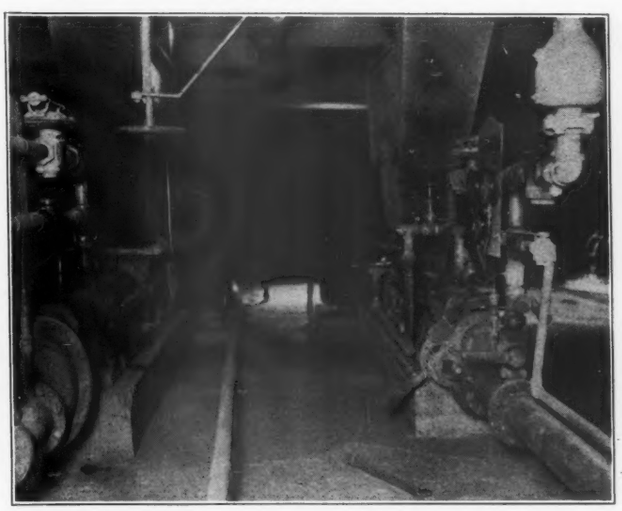


The hoist which hauls cars up the incline from the quarry.

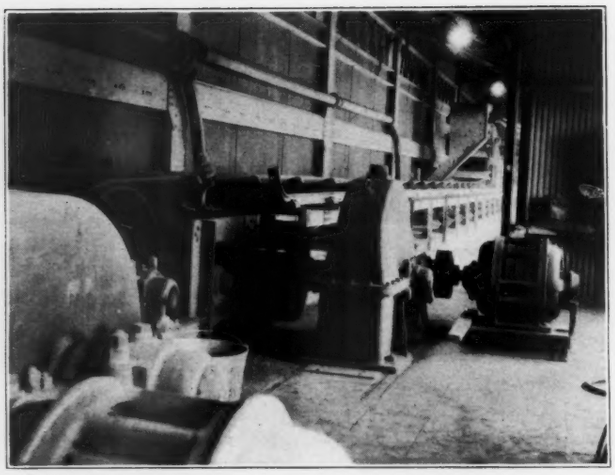
A ⅞- to 2-hp. motor drives the feeder through a Fast's self-aligning coupling. This motor has a General Electric Selsyn generator direct-connected to its shaft. On the drive shaft of the kiln motor is a second Selsyn generator. The rotors of both these generators are excited from the same 60-cycle 110-volt source and between their stator connections is a Selsyn differential motor. As the speed of the kiln motor varies it affects the differential motor which, in turn, operates the carbon-pile resistance. This is in series with the shunt field of the direct-current feeder motor and keeps its speed in synchronism with the kiln motor.

This is said to be the first installation of its kind in the cement industry but the system has been used to some extent in other fields. It has been used successfully to control anti-aircraft guns and batteries of cannon on battleships and for other similar purposes. The first of the feeder drives in this plant was installed in April, 1930, and the other three later in the year.

Each of the four Polysius Solo kilns is 250 ft.



The pumps which transport the cement from the mill building to storage.

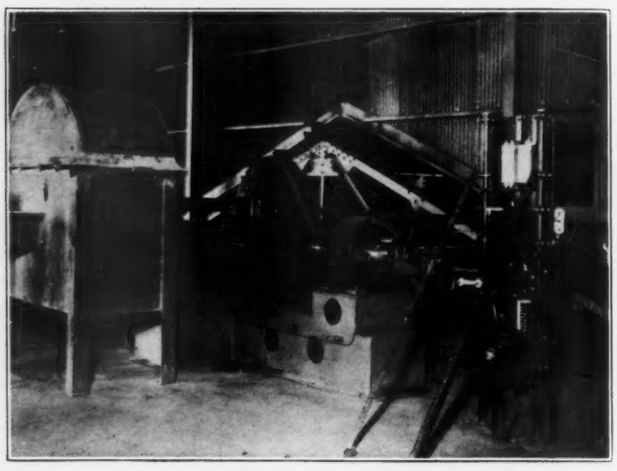


Drive end of the conveyor which hauls raw material from crushing plant to storage. Portable tripper at right.

long. These are unlike the average kiln in that they have four separate sections of various diameters and lengths connected together by funnel-shaped sections. This construction permits drying, calcining, burning and cooling to be done in one operation and is the reason for the name "Solo" given to this type of kiln. Beginning at the feed end there is a 165-ft. 10-in. section 10 ft. in diam., then a 38-ft. section 13 ft. 2 in. in diam. and a 6-ft. 2-in. section 10 ft. in diam. These sections are connected by two funnel-shaped sections each 6 ft. 2 in. long. A 2-ft. funnel section then connects to a 25-ft. 8-in. section 12-ft. in diam., which is used for cooling the clinker. Each kiln is mounted on six water-cooled bearings and is driven by a 60-hp. direct-current motor.

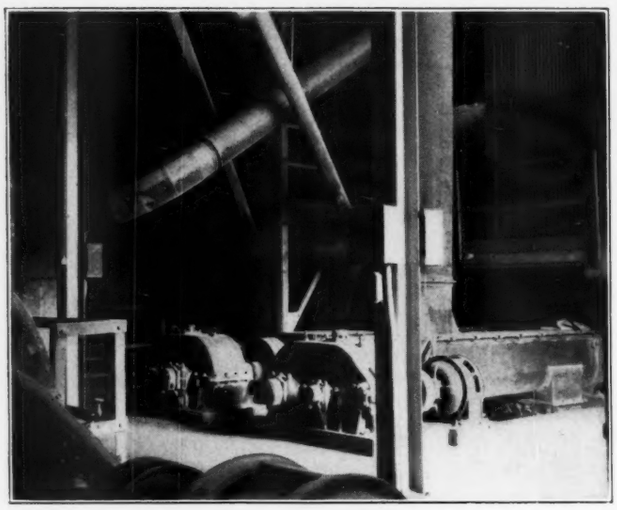
The kilns are pulverized-coal-fired. Each kiln has a 43½-ton-capacity feed bin from which the coal is fed by two small screw conveyors to the kiln-feed pipe. This air-cooled 10-in. pipe extends 30 ft. through the cooling chamber to the firing zone. A 5-ft. 3-in. blower driven by a 60-hp. motor furnishes the air for each coal-feed system. The coal-feed screws are each driven by 4-hp. motors.

The kilns are of a particular construction, as above described, and have burning zones 13 ft. 2 in. in diameter—the largest employed in any cement plant. As the clinker coolers are integral with the kilns, the transfer heat from the cooling of the clinker, as well as that generated by the injection of the pulverized coal, gives high burning temperature, thereby combining all the lime silicates and aluminates with minimum of free or uncombined lime. In addition to this, these Polysius or Solo kilns have proved economical, considering that 37 per cent water is employed in the slurry and that, over a year's operation, the fuel consumption per barrel of clinker produced was less than 100 lb., using West Virginia high-volatile gas slack.



One of the slurry feeders with its special type of drive.

Each kiln has also a concrete dust-settling chamber between the kiln and stack from which a 12-in. screw conveyor feeds to a 6-in. Fuller-Kinyon pump. This conveys the dust to four special bins over the four raw mills. Each bin feeds through a double-screw-conveyor feeder to the mill. The dust-chamber screws are driven by 7½-hp. motors and the mill feeders by 2-hp. d.c. motors, each through herringbone-gear speed reducers. The Fuller-Kinyon pump is driven by a 75-hp. motor. The four concrete kiln stacks are 218 ft. high and 12 ft. in diam. at the top.



Speed-reducer drives of two screw conveyors feeding cement from finish-grinding mills to pumping system.

Clinker drops from the kilns to a 36-in. pan conveyor on 130-ft. centers which runs horizontally beneath the kilns and perpendicular to them, being inclined at its discharge end. This discharges into a 2-roll clinker crusher which empties to a 36-in. inclined pan conveyor on 32-ft. centers. This, in turn, discharges to an enclosed chain-bucket elevator which can empty into either the general storage or to a 24-in. belt conveyor on 96-ft. centers. This operates in the same gallery as the stone-distributing conveyor and has a movable tripper which discharges to the four 1,800-bbl.-capacity mill-feed bins which are arranged in a row along the side of the storage in the same manner as the raw mill bins.

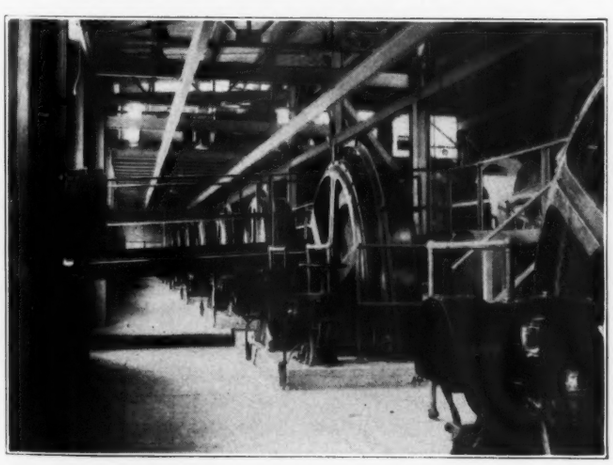
The pan conveyors are both driven through herringbone-gear speed reducers by 15-hp. and 10-hp. motors respectively. The clinker crusher is driven

One of the overhead cranes operating at the raw-material end of storage building. Some of the raw-mill feed bins are at right.

by a 40-hp. motor through a reducer, the elevator by a 15-hp. motor and the belt conveyor by a 10-hp. motor through a reducer. A Norblo unit collects the dust from the clinker crusher.

Gypsum is unloaded from cars on a siding alongside the storage building to a track hopper. A short, horizontal belt conveyor in a concrete tunnel takes the gypsum to a steel-inclosed bucket elevator. This discharges through a chute into the gypsum storage compartment in the corner of the raw storage section. One of the Shepard overhead traveling cranes previously described rehandles the gypsum from storage to 100-ton-capacity compartments in each of the four clinker feed bins. The gypsum conveyor is driven by a 7½-hp. motor and the elevator by a 15-hp. motor.

Each of the four 7-ft. by 42-ft. 8-in. Solo finish-grinding mills is fed with clinker by a 72-in. table feeder and with gypsum by a 40-in. feeder of the same type. Each pair of feeders is driven by a 7½-hp. motor so that, once the ratio of clinker to gypsum is set, the feed will be constant. These mills are driven in the same manner as the raw mills by 700-hp. General Electric super-synchronous motors. The finished cement is taken from the mills by two 20-in. screw conveyors. These feed to Fuller-Kinyon 8-in. and 6-in. pumps which convey the cement to the storage silos. The pumps are driven by 200-hp. and 75-hp. motors respectively and the screw conveyors by 20-hp. motors through herringbone-gear speed reducers. A Box 10-ton-capacity hand-operated traveling crane is used for loading the mills and handling repairs.



Some of the 700-hp. motors driving the raw- and finish-grinding mills.

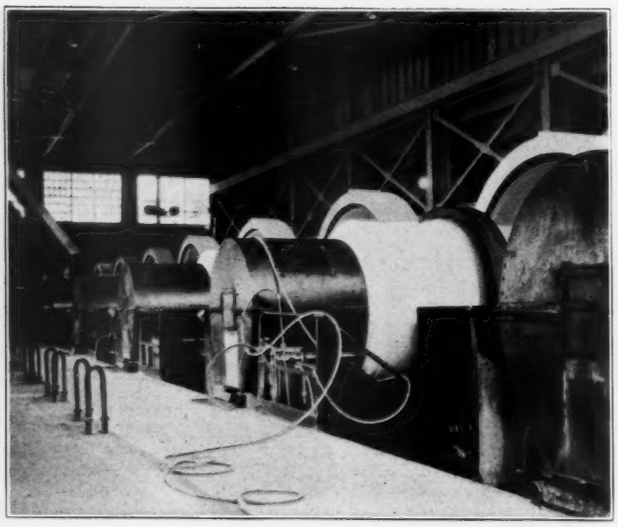
The concrete storage silos, totaling 50 in number, assure at all times an adequate supply of finished Portland cement for prompt shipment as required and to provide cement for inspection tests, etc., whenever called for. The unusual packing facilities and equipment of sufficient capacity to load and ship 15,000 bbl. of cement per day on two separate railroads which, in turn, connect to the eastern trunk lines, allows the routing of shipments over the fastest possible routes to insure prompt delivery.

The original cement-storage consisted of 10 silos each 30 ft. in diam. by 80 ft. high which, with their four interstices, have a total capacity of 163,520 bbl. These silos are of the Meade type in which the weight of the cement is distributed over the concrete foundation mat. Cement is drawn from these silos by two 20-in. screw conveyors, one under each row of silos running through the silos in covered passageways. Each of these conveyors discharges to a 20-in. cross screw conveyor which, in turn, discharges to an inclosed bucket elevator. The screw

Three of the raw-grinding mills in the mill building.

conveyors are driven by 40-hp. motors and the elevators by 15-hp. motors, all through herringbone reducers.

The elevators discharge to two screw conveyors on the third floor of the packing building. The elevators are arranged so that either can discharge to either of the conveyors. Each conveyor discharges to the feed bins of two 3-tube Bates packers, one pair of which feeds to a track on one side of the building and the other pair to a track on the opposite side. Each pair of packers is served by a loading belt conveyor. A fifth packer, recently installed for truck-loading, is fed by a separate 12-in. screw conveyor. Spillage from the car packers is returned to the elevators by a 12-in. screw conveyor and that from the truck packer by a separate conveyor.



Interior of mill room with raw-grinding mills in foreground.

The distributing screw conveyors are each driven by 15-hp. motors through herringbone reducers, the truck-loading screw by a 5-hp. motor through a DeLaval worm-gear speed reducer, each of the five packers by a 20-hp. motor and the two car-loading belt conveyors by 3-hp. motors through herringbone reducers. The spill conveyor from the car packers is driven by a 7½-hp. motor through a herringbone reducer and that from the truck packer by a 5-hp. motor through a DeLaval worm-gear reducer.

This building also has storage space for both cloth and paper bags. A Bethlehem Foundry & Machine Co. continuous-bag wheel on the third floor has a capacity of 40,000 bags per day and is driven through a DeLaval worm-gear reducer and chain by a 25-hp. motor. A 12-in. screw conveyor driven from the same speed reducer takes the dust from the bag cleaner to the packer bins. The bag cleaner discharges to a 36-in. belt conveyor on which the sacks are sorted for repairs. Two 40-tube dust collectors for the packing floor and a third for the bag cleaner are each driven by a 20-hp. motor. A 4,000-lb.-capacity Otis freight elevator serves the various floors.

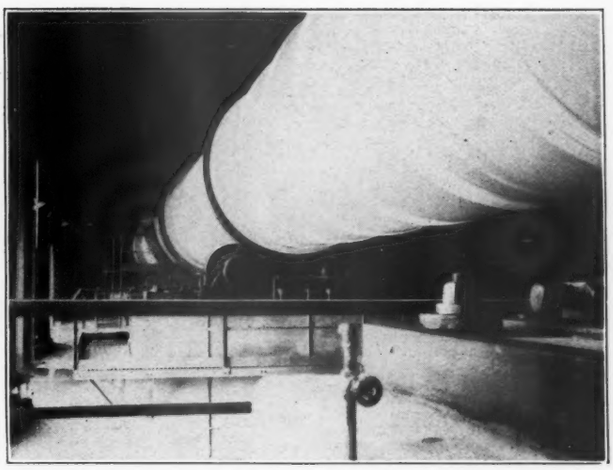
A second unit of ten silos (No. 2) has been added to the original ten. These are also 30 ft. in diam. but are only 77 ft. high and, with their four interstices, have a total capacity of 157,388 bbl. These receive their cement from the same Fuller-

Kinyon pumping system as Silos No. 1. Each row of silos discharges to a 20-in. screw conveyor which discharges to the corresponding collecting screw under the original silos and into the same packhouse. Each of these two screws is also driven by a 40-hp. motor through a herringbone speed reducer.

A third unit of silos (No. 3), completed May 15, 1930, differs in design from the other two units. Due to the track layout and the position of the original silcs, these were built wedge shaped. The unit consists of 19 silos and three interstices and is 80 ft. high. Two rows of eight silos, each 20 ft. in diam., form the long sides of this unit. The two rows are separated by three silos respectively 18 ft., 27 ft., and 36 ft. in diam., the spaces between these three silos forming the interstices. This unit has a total capacity of 164,743 bbl., giving a total storage capacity for finished cement of 485,651 barrels.

Cement is recovered from storage by three 18-in. screw conveyors which discharge to a bucket elevator in packhouse No. 2. This discharges over a Tyler 5-ft. Hum-mer screen to an 18-in. screw conveyor which distributes the cement to bins over the two Bates 3-tube packers. A shuttle belt conveyor transports the sacks from the packers to cars on either side of the building. The belt and shuttle drives are each operated by separate 3-hp. motors through Jones spur-gear speed reducers. The three screw conveyors under the No. 3 silos are each driven by 40-hp. motors through Cleveland worm-gear speed reducers. The bucket elevator is driven by a 20-hp. motor and the distributing screw conveyor by a 25-hp. motor, both through Cleveland worm-gear speed reducers.

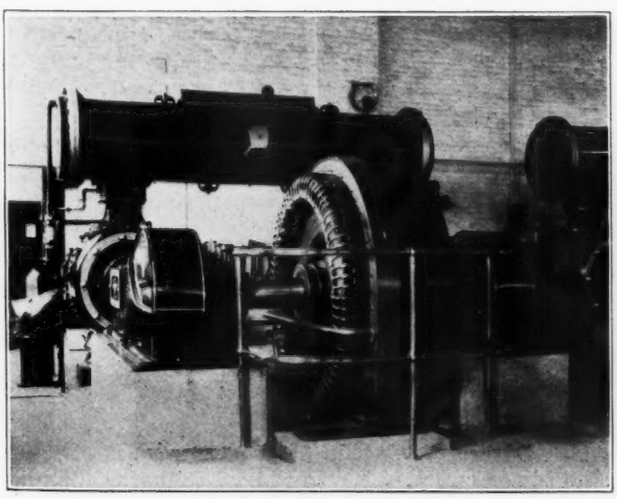
A third packhouse (No. 3) was erected at the same time as silo unit No. 3 and packhouse No. 2 and is, with a few exceptions, a duplicate of the latter. Cement is received from packhouse No. 1 through two 18-in. screw conveyors operating in a covered bridge over the loading tracks. Each of these is driven by a 10-hp. motor through a Cleveland worm-gear speed reducer. From this point on, operations and equipment are identical with packhouse No. 2. The shuttle conveyor is also identical with the other one except that Cleveland worm-gear speed reducers are used. Both these buildings are equipped with Norblo dust collectors.



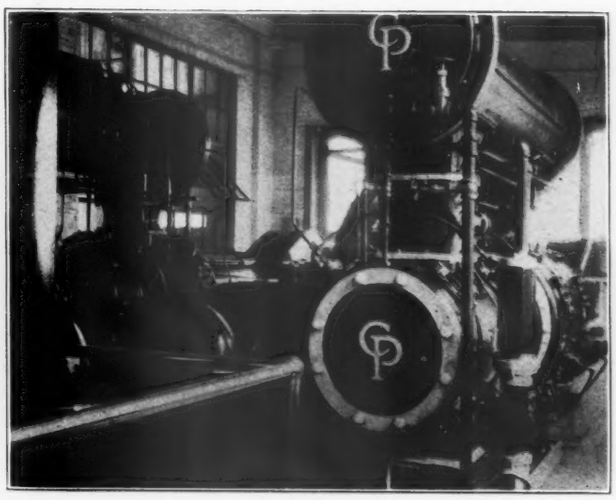
One of the four 250-ft. rotary kilns.

Cars of coal are brought to the plant in hopper-bottom cars on the same tracks used for gypsum. The coal discharges to a steel track hopper from which a mechanical feeder discharges to a small Link-Belt coal crusher. This, in turn, discharges to a 20-in. belt conveyor extending through a concrete tunnel under the storage to the coal plant. Here a steel-inclosed bucket elevator discharges either to the steel coal-mill feed bins or into the storage building. Openings in the top of the tunnel under the storage allow the recovery of stored coal by the same belt conveyor. A portable coal feeder is used in the tunnel. Coal may also be handled from storage to the mill-feed bins by one of the overhead cranes.

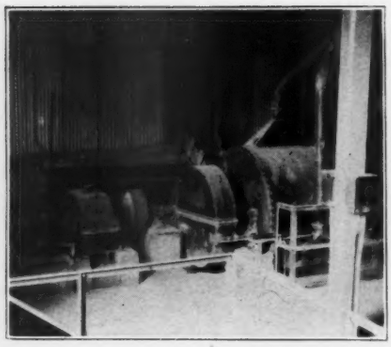
The coal feeder under the hopper is driven by a 7½-hp. motor, the crusher by a 25-hp. motor, and the elevator by a 15-hp. motor, all through herringbone-gear speed reducers. The tunnel feeder is driven by a 5-hp. motor and the conveyor by a 15-hp. motor.



One of the two smaller air compressors.



The 24-in. by 14-in. by 18-in. air compressor.



Pan conveyor feeding clinker from kilns to crusher.

Two of the raw-mill feeders and their drives.

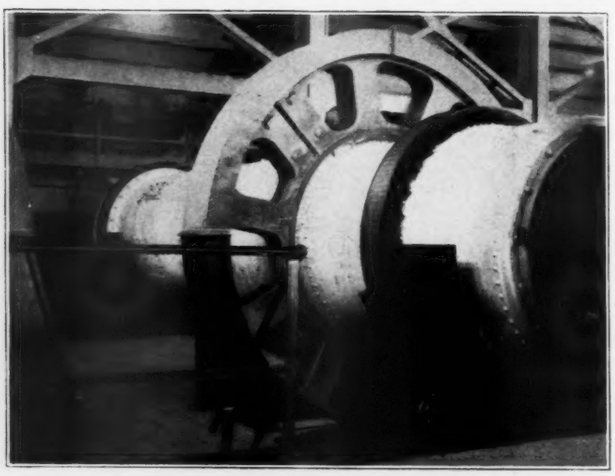
Speed-reducer drive of one of the slurry agitators.

Each of the two coal driers fed from these bins is 6 ft. in diam. by 60 ft. long and is equipped with an automatic stoker. An exhaust-gas washer on each drier prevents the discharge of dust from the drier stacks. A spray in the washer precipitates the dust in the form of sludge onto the bottom of the washer, from which it flows by gravity to a concrete sump. A 2-in. Wilfley pump, of the type commonly used for handling slurry, feeds the sludge back to the kilns. Each drier is gear-driven by a 15-hp. motor, the stokers by 3-hp. motors, and the pump by a 7½-hp. motor.

The driers discharge to the boots of two inclosed bucket elevators which discharge into the steel feed bins over the two coal-grinding mills. Table feeders under the bins are equipped with coal-weighing devices which keep a record of all coal going to the mills. Each of the 3-compartment mills is 6 ft. in diam. by 39 ft. long and is driven by a 360-hp. super-synchronous motor. The elevators are driven by 7½-hp. motors through herringbone reducers. The feeders are driven by 2-hp. motors. The mills have a capacity of 6 tons per hour each of pulverized coal which will pass 99 per cent through a 100-mesh screen. A short screw conveyor feeds from the mills to two 6-in. Fuller-Kinyon pumps, one of which is kept in reserve. These convey the pulverized coal to the storage tanks over the kilns, a Fuller-Kinyon automatic control system insuring a constant supply. The screw conveyor is driven by a 7½-hp. motor through a herringbone gear reducer and each of the pumps by a 20-hp. motor. Two special 5-section filter-tube dust collectors are connected to all parts of the coal plant where dust is raised. Each of the 56-in. fans on these units is driven by a 20-hp. motor.

The most important of the miscellaneous buildings is called the machine shop but it contains more than its name would indicate. It houses not only the machine, blacksmith, and electrical repair shops but also the chemical and physical laboratories, the

Discharge side of the primary crusher with pan conveyor which feeds to secondary crusher.



One of the raw-grinding mills with its feeders and bins in background.

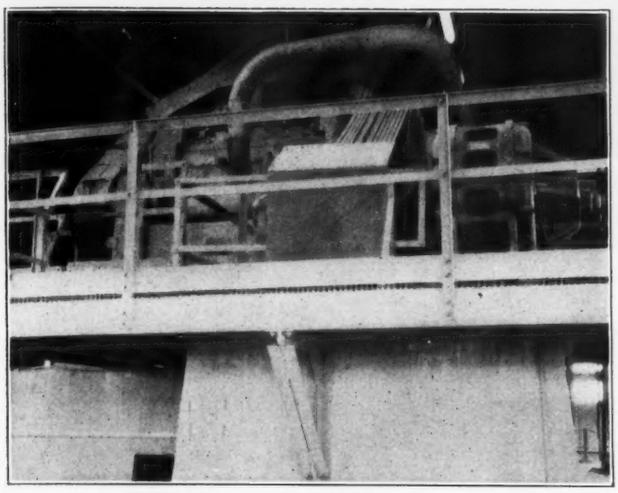
parts storeroom, first-aid room and several offices including that of the plant superintendent.

The machine shop is 56 ft. wide by 130 ft. long. The repair shops are all very completely equipped, containing lathes, radial and upright drills, a shaper, emery wheels, power hacksaws, a bolt threader, portable grinders, a portable wood saw, a Champion forge, one Westinghouse 300-ampere electric welder, and three Oxweld acetylene welders.

The laboratories are also fully equipped to make any desired tests. Equipment in the physical laboratory includes a Southwark Foundry & Machine Co. 200,000-lb.-capacity compression tester, a Denver Fire Clay Co. laboratory crusher, a Riehle tensile tester, a Tyler Ro-Tap sieve shaker, a Wonder concrete mixer and all other necessary equipment.

The chemical laboratory contains a complete set of analytical balances, ovens and other necessary equipment.

The transformer building is located near the machine shop and is a modern structure of concrete, steel and brick. Originally it consisted of two rooms, each 49 ft. wide. One of these is 33 ft. long and houses two oil switches and four 2,000-kva. transformers which step down the incoming 33,000-volt current to 2,200 volts. Three of the transformers are connected in closed delta while the



The single-roll primary crusher with drive at right.

fourth is used as a spare. Transformers for further reduction to 440 volts are located in other parts of the plant. Three 33,000/110-volt potential transformers furnish lighting current. Power is received in two lines from two different sources insuring against lost time due to power failure.

The second room in the original building is 42 ft., 6 in. long. It houses three 250-kw., 230-volt, d.c. generators each connected to a 375-hp. motor for exciting all synchronous motors in the plant. The 27-panel switchboard in this room controls the distribution of power to the entire plant and has controls for the larger motors.

The motors operating the ten grinding mills and the crusher use 2,300-volt current. Direct current at 230 volts is used for motors operating the table feeders, stack-dust feed screws, coal-dust kiln-feed screws, and the kilns. All other motors use 440-volt alternating current.

This room also houses two Chicago Pneumatic

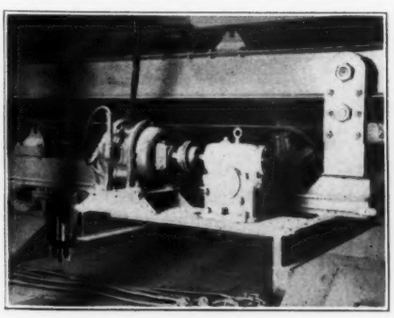
The hammer-mill used for secondary crushing, with pan conveyor from primary crusher at right.

23-in. by 13-in. by 16-in. two-stage air compressors which are driven by built-in 300-hp. motors. When the plant was enlarged a 20-ft. by 60-ft. addition was built to this room. It houses a new Chicago Pneumatic double two-stage 24-in. by 14-in. by 18-in. air compressor which is driven by a built-in 700-hp. motor. This room also houses an air receiver and Chicago Pneumatic after-cooler for the two smaller compressors. The air receiver for the large compressor is in a concrete pit outside the building. Each compressor has a Reed air filter on its intake. These compressors supply all air for the plant and are supplemented by a 12-in. by 10-in. single-stage compressor of the same make in the quarry. This is driven by a 60-hp. motor.

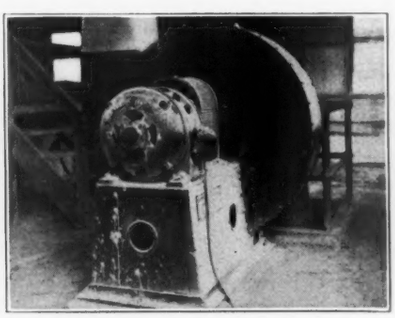
A total of 205 motors with a total rated horsepower of 12,405 are used in the plant. A fairly even distribution of power consumption is obtained by running a maximum of five mills during the day and all eight of them at night.

Water for the plant is stored in a large reservoir some distance from the plant. A Worthington 600-g.p.m.-capacity, centrifugal, deep-well pump furnishes water to the reservoir. Three Aldrich centrifugal service pumps feed from the reservoir to the plant. Each pump is driven by a 25-hp. motor.

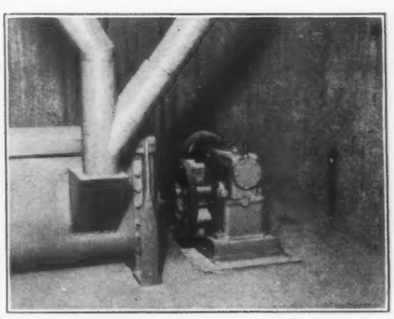
The company is constantly improving the grounds surrounding the plant and now that the construction work is completed the property will soon pre-



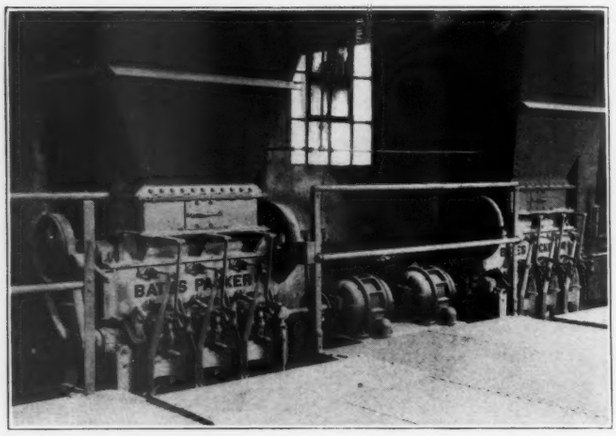
Drive end of one of the shuttle conveyors in the packing building.



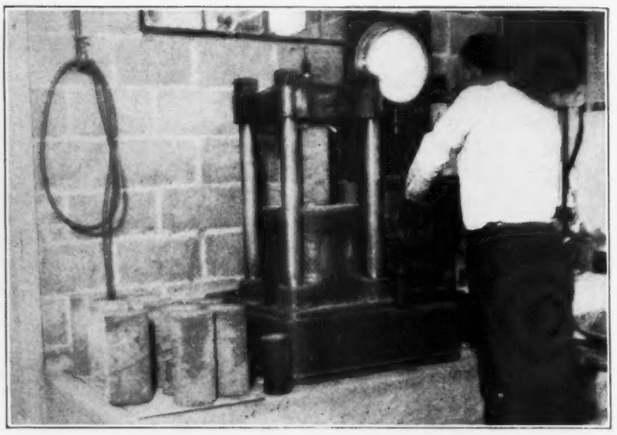
One of the fans used for dust collection in the crusher building.



Speed-reducer drive of screw conveyor in one of the packhouses.



The two packers in one of the new packing buildings.



Testing a concrete cylinder on the hydraulic testing machine.

sent a landscaped appearance. A Link-Belt K-36 crawler crane which is doing this work is also used for storing and handling excess coal, etc. A Mack 5-ton truck and smaller Reo and Chevrolet trucks are also used for general purposes about the plant.

The plant was designed and built under the supervision of the late Richard K. Meade in coöperation with the engineering staffs of the cement company and of the Polysius Corp. The M. A. Long Co. was the general concrete contractor for both the original plant and the enlargements. The structural steel was fabricated by the Bethlehem Construction Co. and the concrete kiln stacks as well as the last silo storage were erected by the Rust Engineering Co. The Polysius Corp. furnished practically all the equipment and in this article any equipment not otherwise accredited was furnished by that company. Electrical equipment, including switchboards, controllers and most of the motors, was furnished by the General Electric Co. Crouse-Hinds conduit is used.

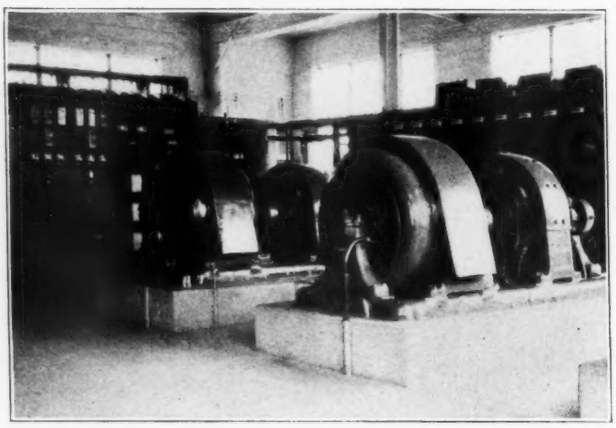
With all of the features outlined above, it is only to be expected that the Keystone Portland Cement produced by this company should be of high quality. Tests made by the company over a considerable period of time gave the following average results:

Tensile Strength 1 : 3 Sand		Compression Strength 1 : 3 Sand	
1 day	209 lb.	1 day	1,071 lb.
2 day	280 lb.	2 day	1,715 lb.
3 day	351 lb.	3 day	2,500 lb.
7 day	388 lb.	7 day	3,281 lb.
28 day	458 lb.	28 day	4,375 lb.

This company has also lately brought out a high-early-strength Portland cement sold under the trade name of "Velroca." This is a true Portland cement manufactured by a refined process of proportioning, pulverizing, and burning, without the use of any admixtures before or after burning. Recent tests made by the company have shown it to possess the following strength characteristics:

Tensile Strength 1 : 3 Sand		Compressive Strength 1 : 3 Sand	
1 day	303 lb.	1 day	1,942 lb.
2 day	365 lb.	2 day	2,238 lb.
3 day	398 lb.	3 day	2,834 lb.
7 day	465 lb.	7 day	4,254 lb.
28 day	475 lb.	28 day	4,843 lb.

The main offices of the Keystone Portland Cement Co. are at 123 S. Broad St., Philadelphia, Pa. Officers are: Harold M. Scott, president; Thomas Barnes II, and Thomas Morrison, Jr., vice-presidents; E. L. Clarke, secretary and treasurer; H. H. Leh, general manager; T. N. Haffner, superintendent and engineer; V. P. Brader, purchasing agent; C. D. Clugston, sales manager; and F. L. Bass, chief chemist. A new office building near the crusher house contains the general and private offices.



Two of the three generators which furnish direct current for the excitation of the synchronous motors.

Tampa Phosphate Shipments in 1930 Break Previous Records

Shipment of phosphate through Tampa elevators established a new high record in 1930 with a total of 1,841,400 tons dispatched to foreign and coastal ports. The total of phosphate shipments from this port in 1930 is 154,000 tons greater than the record aggregate of 1929, and is 339,000 tons in excess of the amount shipped in 1928, which was a record up to that time.

Chief among the foreign ports to receive the 780,000 tons of phosphate shipped abroad from Tampa in 1930 in the order of their importance as markets for the chemical were: Hamburg, Rotterdam, Osaka, Genoa, Danzig, and Tarragona, Spain. Phosphate exports from this port in the last five years have increased 40 per cent, the gain being at a steady rate of about 40,000 tons a year.

Should The Big Associations Merge?

"Yes," Is the Almost Unanimous Vote of Exhibitors Who Reply to Editorial

Says Joint Convention Would Save Extra Cost

To the Editor:

Our company is heartily in accord with the thought expressed in the editorial "Should the Big Associations Merge?" The very fact that the stone and gravel shows were held in the same city and in the same hotel, and that many of the exhibitors had the same exhibit space at both of the conventions, proved very convenient for the exhibitors and, of course, meant a considerable saving as well. Conventions are expensive. Not only do they mean the expense to exhibit and to have representatives there, but they also take a number of representatives away from their regular duties, which, of course, is inconvenient at times. Personally, and I know that some of our representatives feel the way I do, I think that a joint convention would be most desirable.

NORDBERG MFG. CO.
Milwaukee, Wis. Delbert Kay, *Adv. Mgr.*

Non-Exhibitor Inclines Toward Merger Proposal

To the Editor:

We have not been exhibiting at any of the conventions or shows around the country for the last two or three years. The writer did attend the road show and our Mr. Herbster attended the sand-and-gravel convention. Our joint opinion is that, if the sand-and-gravel and the crushed-rock men would join with the road show and hold their conventions all at one time, much better results would be obtained. The problem might be to find a location where there was sufficient room to take care of the exhibit. We would be inclined to make an exhibit at a joint show of that kind, but certainly would not consider attending three different conventions.

THE GODFREY CONVEYOR CO.
Elkhart, Ind. H. W. Bonnell, *Sales Mgr.*

Represents a Movement in the Right Direction

To the Editor:

For the first time this year, we joined the National Crushed Stone Association and had a small exhibit at St. Louis. Our sales manager who attended this meeting was much disappointed with the result, and with the lack of interest shown by the delegates and visitors in the exhibits. Joining the two Associations referred to in your letter sounds to us like a good idea, although we are very little interested in the sand-and-gravel group. There are very few trade shows or exhibits that are earning their salt, and mergers and concentration, and the reduction in the number of shows and their frequency, represent a movement much to be desired.

SULLIVAN MACHINERY CO.
Chicago, Ill. S. B. Kind, *Adv. Mgr.*

Favors Idea and Urges Centrally-Located City

To the Editor:

The writer does not see why a merger of the three big annual conventions could not be accomplished with a decided saving to every manufacturer exhibiting. It can not help but be reflected in the ultimate price to the user. The writer further believes that these exhibitions could very well be held every other year, provided they are held at a central point like Chicago or St. Louis. Furthermore, the meetings and programs that are available at the conventions are "undersold" to the trade in general, although the meetings this year were considered as being better attended than usual and the tendency may be this way. If not, it should be, for the industry is young and has many growing pains, but these can be quieted a great deal by the interchanging of ideas from the men who know. What are the real reasons for not combining these three conventions?

IOWA MFG. CO.
Cedar Rapids, Ia. Kenneth Lindsay, *Adv. Mgr.*

Concurrent Conventions Save Time and Expense

To the Editor:

We have read with much interest the editorial "Should the Big Associations Merge?" We are in favor of the two associations in your field at least holding their annual conventions concurrently. It is our opinion that too much money is being spent for conventions and expositions, and by combining two of these organizations, or at least holding concurrent conventions, it would not only save initial expense, but it would save the time of the people who attend these meetings.

A. LESCHEN & SONS ROPE CO.
St. Louis, Mo. L. H. Gault, *Adv. Mgr.*

This Exhibitor Opposes Idea of Consolidation

To the Editor:

Personally, I have often wondered about the advisability of combining the sand-and-gravel and crushed-stone industries, as suggested in your editorial "Should the Big Associations Merge?" Of course, the tendency everywhere is toward consolidation, but, on the other hand, some concerns are finding the large organizations too bulky to combat and to take advantage of breaks. I am sure that the plan of having the two conventions in the same place and in succeeding weeks is a step in the right direction. I am not sure about the advisability of combining definitely at the present time. I do believe that it might be well to have the two conventions overlap by one or two days. In this way the two organizations could meet on a common field and observations could be taken. Without doubt if the two joined forces there would be a split in the departmental meetings and I believe that most manufacturers would be inclined to welcome the experiment.

STEPHENS-ADAMSON MFG. CO.
Aurora, Ill. E. J. Patton.

Approves Proposal for Tie-Up of Associations

To the Editor:

The suggestions made in your editorial on the merging of the big associations, in regard to reducing the expense of exhibitions, is exactly in line with the policy which we adopted some years ago. After due consideration of the advantages and disadvantages, we definitely decided not to exhibit at any of the industrial shows, and we have since consistently followed this policy. Perhaps we are too conservative in this matter, yet we believe it is in line with the best modern thought in regard to the necessity of reducing the cost of sales and distribution.

Akron, O. E. J. B.

Both the Producers and Exhibitors Would Gain

To the Editor:

It is my opinion that a merger of the associations catering to crushed-stone and sand-and-gravel producers would work out to the mutual satisfaction of all parties interested, including the manufacturers of equipment. The equipment manufacturers would probably benefit the most by a merger of this kind, and our motive would be, no doubt, a selfish one. There is no question in my mind that the crushed-stone and sand-and-gravel producers would benefit equally with the manufacturers, as their industries are so closely allied that the benefits derived from the saving of time and expense, and attending one joint meeting and exhibit, would be equal to the benefits derived by the manufacturers.

JAMES H. BEANS FOUNDRY CO.
William H. Sallwasser.
Martin's Ferry, O.

Recent Developments in the Mining and Processing of Feldspar*

By ALBERT ACKERMAN
Consolidated Feldspar Corp.

THE word feldspar probably doesn't mean much to the average person. Yet, measuring a civilization by its refinements and by the things that make those refinements possible, this mineral contributes extensively to modern life. In the sanitary, electrical, chemical and medical fields it fills an important place. In the home the housewife every day depends upon the vast number of articles containing it. From scouring soap to the costliest beauty preparations, from the bathtub to the most minute parts of the radio—we find this versatile material being employed. It appears in artificial teeth, in high voltage electrical insulators and even in some semi-precious stones—to select three widely different uses. It enters into the manufacture of pottery, porcelain, floor and wall tile, terra cotta, porcelain enamel, glass and abrasives.

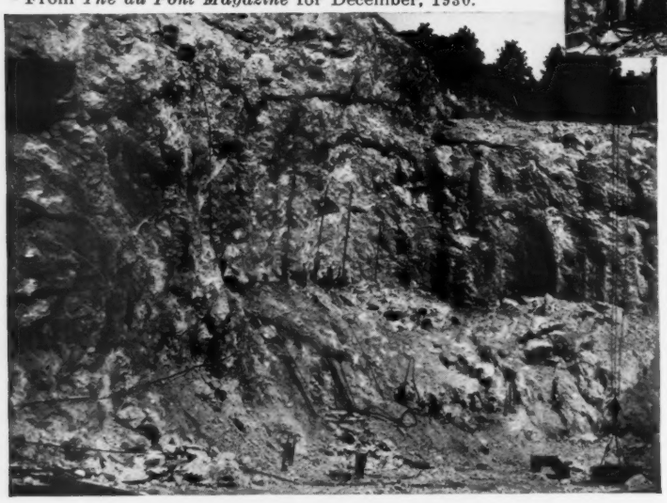
Feldspar seems to be one of those products which is so familiar to the various industries that no particular attention is given to its origin or makeup, nor to the why's and wherefore's of its use. A few details about it may not be amiss here.

The word itself might be taken to mean a "field rock." If we accept this literally, the term would include practically all types of rock, which would be as incorrect as to think of it as the name of a specific mineral such as iron or copper. The fact is that in commercial parlance and from a purely mineralogical standpoint, feldspar is a general term referring to a group of important rock-forming minerals. And because of the chemical composition of this product and its physical behavior at high temperatures, it is an important and useful material.

The feldspars are all anhydrous silicates of aluminum containing either potash, soda or lime alone, or two of these bases together. In the form commonly known as feldspar rock, it occurs in pegmatite formations of crystalline rock masses in company with quartz, mica and other minerals.

The ore is found in the igneous rock sections all the way from the extreme northeastern part of Canada, running southwesterly in a line roughly paralleling the Atlantic seaboard to points in Georgia and Alabama. The most important producing districts in the eastern half of the country are located in Maine, New Hampshire, Connecticut, Maryland, Virginia and North Carolina. It appears, too, in the provinces of Quebec and Ontario in Canada. Commercial deposits are also operated in the states of Colorado, South Dakota, Arizona and California.

Considering this wide distribution in Canada and the United States, you might think that there would be a plentiful supply of commercially-acceptable grades. But Nature has not been as generous in this respect as one might be led to believe. Commercial deposits having economic value are few and far between; those which have been and may later be developed into mines or quarries are limited both as to size and number.



Loading the holes in the feldspar mine of the Carolina Mineral Co., Spruce Pine, N. C., in preparation for a blast.

Like the typewriter or telephone, feldspar is spoken of as a matter of course, and bought and used as a matter of necessity. But just as there is a difference in the service given by and the results obtained from typewriters and telephones, there is an even greater difference in the various grades of this mineral. One deposit will yield material of certain characteristics, while that from another located nearby will be entirely different. The chemical make-up of the rock and the quantity and nature of the foreign sub-

* From *The du Pont Magazine* for December, 1930.

stances present determine its quality. Only deposits containing from twenty to forty per cent of merchantable feldspar are worth operating. One that will yield twenty-five per cent is considered a mine.

The feldspar industry has developed from a modest beginning to an important business without any apparent systematic control or regulation. The exact date representing the first production of this mineral in the United States is not known, but goes back approximately seventy years. When the first American potteries were established, it was only natural that their owners should look for local deposits of feldspar rather than depend upon the supply imported from abroad. Their first success was in the New England states—In Maine, particularly—and in eastern Pennsylvania and Maryland. The deposits in Maine are still being operated, but those in Pennsylvania were discontinued a number of years ago, after they were depleted. During the past eighteen years North Carolina has produced more feldspar than any other state in the Union. Last year the output amounted to approximately 103,200 tons—about fifty-two per cent of the total.

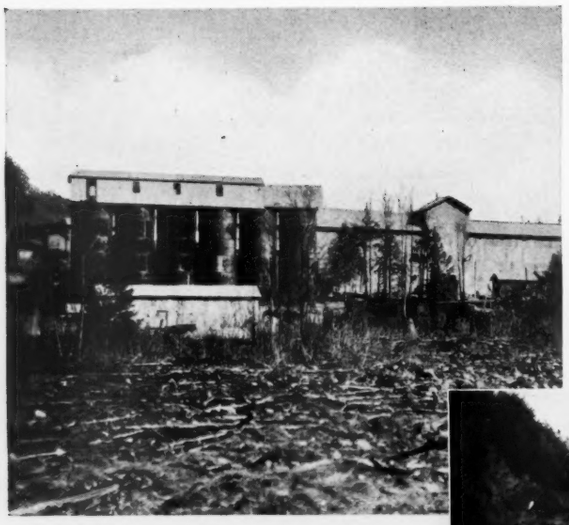
Before, during, and after a shot that brought down a large quantity of feldspar.

Naturally, in the beginning, crude methods were used to extract the ore, but as the industry grew and developed, more modern systems of mining and grinding have been adopted. During the past four or five years more progress, coupled with scientific control, has been made than in all the previous years of the industry.

Feldspar is mined by both open-cut and underground methods. The open-cut system is practically the same as all modern quarrying methods. Underground operations are essentially the same as the mining of other ores having somewhat similar physical characteristics. Due to the hard, resistive nature of the mineral, it is easy to visualize the importance of the type of explosives necessary in order to produce the greatest amount of ore at the least cost. Du Pont explosives are used extensively in the mining of feldspars throughout this country.

After the ore is mined and before it can be used by the ceramic manufacturer, it must be ground into an almost impalpable powder. No great stretch of imagination is required to picture the crude grinding equipment of the early days. It consisted of chaser mills, supplemented later by ball mills. Coming down through the years we find that this type of equipment was added to, so that a modern feldspar grinding mill consists of suitably-designed crushers, rolls, dryers, mechanically-operated screens and air separators. It is necessary to include in this equipment magnetic separators in order to prevent contamination from iron, and there are, of course, bagging machines, conveyors, elevators and so on.

The more modern mills are so designed to permit of uniformly controlling the quality of the product. Large storage bins or silos are provided, and as they are being filled with crushed feldspar, automatic samplers, working continuously, take out enough of it to constitute an accurate cross-section of the material in each bin. This sample is carefully analyzed in a modern chemical laboratory, so that the exact



Above—Plant of the Consolidated Feldspar Corp. at Erwin, Tenn. Right—View in the Hugo mine at Keystone, S. D., operated by the same concern.

composition will be known and will check with consumer requirements.

As might be expected, in the early days of the industry uniform feldspar was not to be had. The rock was mined where it was most easily obtained and most acceptable. It was prepared by methods which left plenty of room for guesswork, and was shipped when and where it was called for. Manufacturers used the kind that some one thought or guessed was right, and trusted to luck for results. If the particular feldspar purchased functioned satisfactorily, the ceramic manufacturer did his best to secure more of a similar make-up, but his efforts for the most part were in vain. And even today where scientific control methods are not used, producers simply hope that second shipments will be of the same quality as the first ones.

The wasteful expense of this unsystematic procedure was enormous. In order to eliminate this condition, chemists and engineers were employed by the producers, and laboratories were started. Today, under the technical control of able executives and engineers, it is possible to determine the exact results any specified grade of feldspar will give, and to supply a uniform quality.

Through recent years a systematic study of feldspar has progressed to a thoroughly scientific stage, until now no part of the industry plays a more important rôle than the modern, well-equipped testing laboratory. Research in the field of metallic alloys has made this the age of steel. A similar intensive study in the field of ceramic alloys is bringing feldspar into its own.

No longer is it possible to enter the feldspar field by just finding what may appear to be a suitable deposit and erecting a small grinding unit to prepare the mineral for the ceramic industry. To prepare and market this commodity successfully, it is necessary to have extensive plants designed to produce feldspar that will run uniform from shipment to shipment. This, of course, can only be accomplished by having well-equipped chemical and physical laboratories to determine accurately in advance of each shipment the true characteristics of the material. The larger producers have cast off "rule-of-thumb" systems for scientific control methods.

The feldspar and ceramic industries are so closely allied that it is impossible to forecast the developments in one without taking the other into consideration. The progress already made indicates that their future is practically without limit.

Comprehensive Potash Bibliography Issued by Bureau of Mines

The publication of Bulletin 327, "Potash Bibliography to 1928 (Annotated)," is announced by the United States Bureau of Mines, Department of Commerce. The bulletin, which is by J. F. T. Berliner, is a review and compilation of technical literature on potash salts, including the alunites, and their foreign occurrences.

The review is confined to the technical literature of the origin, history, and foreign occurrences of saline potassium minerals, their mining, description, treatment, and physical-chemical relations. The literature on alunite, jarosite, and related minerals has also been included.

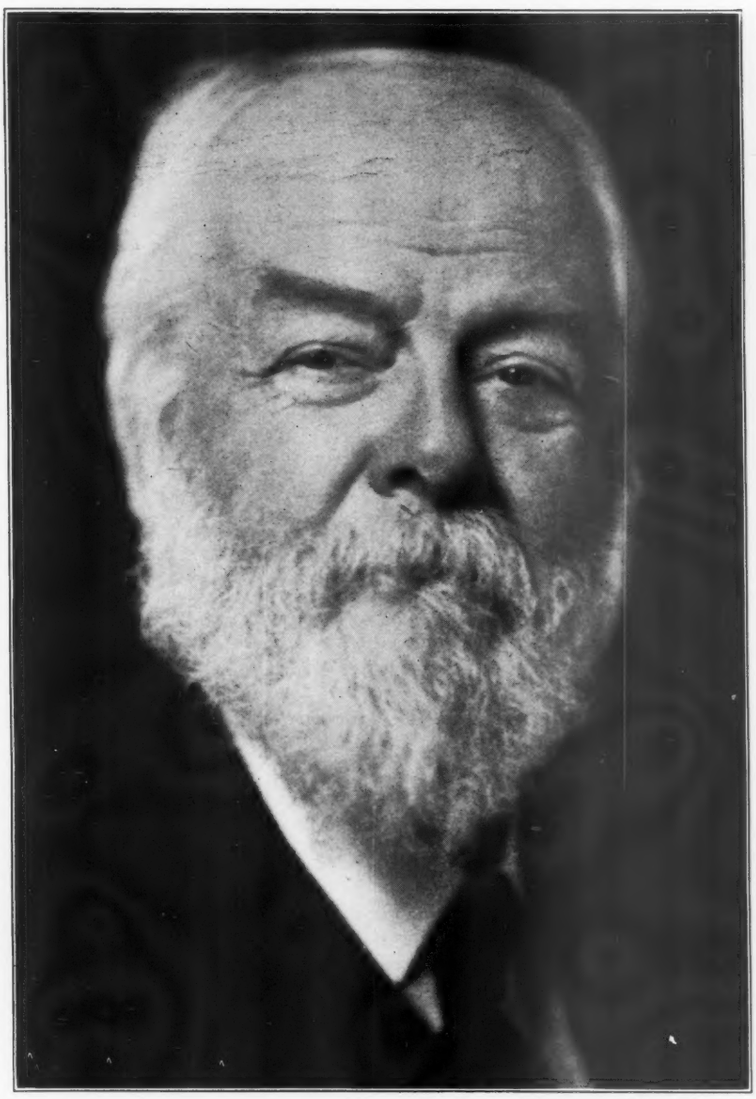
An attempt has been made to survey all the published technical data on potash minerals, the nature of their occurrences, conditions for their formation, theories on their genesis, and their chemical and physical properties. The mining and treatment of potash salts, the equipment and operational factors involved, and related subjects are considered.

The material in the review is arranged chronologically and alphabetically according to authors within each year. An author index and a detailed subject index are appended. An index of the numerous potash and associated minerals with their synonyms and empirical compositions is also included.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 90 cents.

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.



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GEORGE C. OWEN
President
Maine Sand and Gravel Co.,
Portland, Me.

Personal Mention

Harry Hardie was named president of the Myers Sand & Gravel Co. of Anderson, Ind., at the annual meeting held recently. Other officers are **Phillips B. O'Neill**, vice-president, and **Linfield Myers**, secretary-treasurer.

J. J. Keegan, Wenatchee, Wash., is constructing a limestone crushing plant capable of turning out 50 tons daily at Okanogan, Wash. The plant will be in operation by the end of March.

Bert J. Stearns, F. N. Burton and **Martin Meier**, Hemet, Cal., are planning the development of calcium-carbonate beds recently uncovered on the Martin Meier ranch, five miles south of Winchester. The material will be mined and crushed for agricultural purposes.

Lester Ryan, former general manager of the Kalamazoo Cement Products Co., has acquired control of the Leenhouts Gravel Co., also of Kalamazoo, Mich.

James S. Burch, who has been identified with the technical staff of the American Road Builders' Association, has been appointed research engineer of the Wire Reinforcement Institute, Washington.

O. A. Rousseau, assistant manager of the sales engineering department, Norton Co., Worcester, Mass., spoke on recent developments of the abrasives industry before the Hartford, Conn., chapter of the American Society for Steel Treating on Feb. 10.

William MacFadden, formerly vice-president of the Chicago-Naugatuck Crucible Co., has joined the Bartley Crucible & Refractories Co., Trenton, N. J. He will serve in a general executive capacity and have his headquarters at the company's general offices in Trenton.

Gerard Swope, president, General Electric Co., New York, was the principal speaker at the fifty-first annual banquet of the Engineers' Society of Western Pennsylvania, held at the William Penn Hotel, Pittsburgh, on Feb. 26.

Thomas Cocker, who has been made manager of the Buffalo office of the Chain Belt Co., Milwaukee, has been succeeded as manager of the Cleveland office by **Mr. Smallshaw. Frank Gary** has been transferred from the Buffalo office to St. Louis to take the place of **Mr. Smallshaw. Hy Bergis** has been transferred from the Seattle office to the Portland office and **Gerald Nichols** has gone to take charge at Seattle. **W. F. Nichols** continues as Northwest manager.

J. W. Kelly of the research laboratory, Portland Cement Assn., Chicago, delivered an illustrated lecture Feb. 10 at Redlands, Cal., before the members of the American Assn. of Engineers of San Bernardino and Riverside counties. His subject was "Quality Control of Concrete."

Fred Johnson, owner of the Kalkar Products Quarry Co. of Santa Cruz, Cal., is jubilant over the record his company made during 1930. During the twelve months the company shipped out an even 200 carloads, a 16 per cent increase over the previous year and a 25 per cent increase over two years ago. This year, Mr. Johnson believes, will be as good, if not better than last.

Ralph Modjeski, consulting engineer, was presented with the Washington Award for 1931, on Feb. 25, at a reception held in the Palmer House, Chicago. The award was made by the Washington Award Commission representing the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the Western Society of Engineers. Mr. Modjeski had previously been recognized by such honors as the John Fritz Medal, the Franklin Medal, the French Legion of Honor and two honorary degrees of Doctor of Engineering.

Reagan Houston has been made president of the Republic Portland Cement Co. to succeed J. H. Smith, who died recently.

Bennett R. Bates has rejoined the staff of The Dorr Company, with headquarters in New York.

W. G. Jones, president, W. A. Jones Foundry & Machine Co., Chicago, has sailed for the Orient, where he will spend three months.

H. P. Rowlands, superintendent of the Hamilton Gravel Company's two plants at Hamilton, O., has moved from his former residence near one of the plants to his country home on the Dartown and Richmond pike about two miles distant.

George St. John Perrott has resigned as supervising engineer of the Pittsburgh Experiment Station of the U. S. Bureau of Mines to accept a position on the research staff of the A. O. Smith Corp., Milwaukee, Wis. Mr. Perrott joined the Bureau in 1917, and in 1918 was placed in charge of the unit of the Chemical Warfare Service. Since 1919 he has been almost continuously at Pittsburgh.

William B. Todd has been appointed general manager of sales of the Jones & Laughlin Steel Corp. He was formerly assistant general manager of sales. In 1922, he resigned a vice-presidency in the Union Drawn Steel Co. to join the Jones & Laughlin sales staff as manager of sales of the cold-finished division.

D. C. Prince has been named engineer of the switch-gear department of the General Electric Co. at Philadelphia, according to an announcement by Neil Currie, Jr., manager of the plant. The appointment, which was made effective as of February 12, includes supervision of switch-gear research activities at Schenectady.

Obituary

Archie Hall, 25, an employee at the Michigan state cement plant at Chelsea, was instantly killed Thursday morning, Feb. 12, when his clothing became entangled in the machinery used to pulverize coal. Mr. Hall had been in the state's employ about five years. He is survived by a widow and two children.

Charles Parsons, 77, inventor of the Parsons steam turbine, died while on a cruise of the West Indies on Feb. 11. He became a partner in a British machinery firm in 1883 and the following year built the first steam turbine, which was employed for driving a dynamo. It was not until 1894 that he applied his machine to the propulsion of ships.

Henry B. Utley, a director of the International Harvester Co., and until his retirement a few weeks ago a vice-president of the company, died Feb. 11, at Beverly Hills, Cal. Mr. Utley was born at Rome, N. Y., in 1855. He had been connected with the Harvester company, except for a short intermission, since 1886.

Henry M. Wallis, Sr., Racine, Wis., pioneer tractor manufacturer, died, Feb. 6, from injuries sustained Nov. 11, in an automobile accident on his stock farm near Racine. He was born June 24, 1851, at White Pigeon, Mich., and became associated with the J. I. Case Plow Yorks, Racine, in 1883, becoming president in 1892. He organized the Wallis Tractor Co. in 1912. The corporations later were consolidated and several years ago were sold to the Massey-Harris Co., Ltd., Toronto, Ont.

Walter S. Dickey, of Kansas City, Mo., head of the W. S. Dickey Clay Manufacturing Co., died recently.

Coming Events

March 18, 1931. Pittsburgh, Pa. Regional meeting and dinner of the American Society for Testing Materials, Hotel William Penn. P. J. Freeman, secretary, 519 Smithfield St., Pittsburgh.

March 19, 1930. Kansas City, Mo. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. K. C. Athletic Club. C. M. Carman, Universal Atlas Cement Co., Independence, Kan., chairman.

April 2, 1930. Davenport, Ia. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. Hotel Blackhawk. H. F. Tyler, Dewey Portland Cement Co., Davenport, Ia , chairman.

April 14, 1930. Albany, N. Y. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. Hotel Ten Eyck.

April 17, 1930. Pittsburgh, Pa. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. William Penn Hotel.

April 13-18, 1931. Cleveland, O. National Industrial Equipment Exposition, in connection with Congress on management, maintenance and materials-handling of A. S. M. E. G. E. Pfisterer, managing director, 308 W. Washington St., Chicago, Ill.

May 4, 1931. New York, N. Y. Thirteenth exposition of Chemical Industries, Grand Central Palace. International Exposition Co., managers, Grand Central Palace, New York.

June 3-4, 1931, White Sulphur Springs, W. Va. Thirteenth annual convention, National Lime Assn., Greenbrier Hotel. Norman G. Hough, president and general manager, 927 15th St., N. W., Washington, D. C.

Pumpings from the Old Pit

Excerpts from the old files of PIT AND QUARRY *reveal many interesting sidelights on the activities of the pits, quarries and plants of former days. These, interesting by comparison with practices in vogue today, are printed in this column each issue.*

Fourteen Years Ago

THE Ottawa Silica Co., Ottawa, Ill., announced the completion of plans and specifications for a new $150,000 sand plant. The structure, to be of reinforced concrete throughout, was planned to have a capacity of 60 carloads per day. James and Charles B. Herring were the owners.

* * *

Incorporation of the Wolverine Stone Co. of Detroit with a capitalization of $50,000 was announced. The incorporators were A. A. Albrecht, William B. Gregory, and William A. Hubbard.

* * *

Formation of the Iowa Sand & Gravel Assn. by a number of producers in that state who conceived the idea while attending a short course at Iowa State College, Ames, Ia., was announced. Officers of the infant organization were: S. H. Brown, Lake View, president; R. C. Fletcher, Des Moines, vice-president; W. R. Webster, Mason City, secretary; and A. D. Finch, Sabula, treasurer.

* * *

Ten Years Ago

Frederick W. Kelley, president of the Helderberg Cement Co., Albany, N. Y., was elected president of the Albany Chamber of Commerce.

The Rockland & Rockport Lime Co., Boston, Mass., perfected plans for the erection of a new lime plant at Rockland, Me. The plant was to consist of five vertical kilns and a gas producer for firing.

* * *

The Glens Falls Portland Cement Co., Glens Falls, N. Y., elected the following officers: George F. Bayle, Sr., president; Byron Lapham and George F. Bayle, Jr., vice-presidents; John E. Parry, secretary; and Arthur W. Sherman, treasurer.

* * *

Five Years Ago

Announcement of the publication and distribution of the 1926 edition of PIT AND QUARRY HANDBOOK was made. The first edition appeared in 1923.

* * *

"Handling Sand and Gravel Efficiently from Oregon Rivers," was the subject of an interesting article by E. D. Roberts. The story discussed the methods employed by operators along the Columbia and Willamette Rivers. Among the companies producing were the Columbia Digger Co., The Willamette Gravel Co., and the Portland Gravel Co.

Carl L. Van Voorhis, prominent Ohio civil engineer, was named chief engineer of the Ohio Crushed Stone Assn. His previous connections included the secretaryship of the Ohio Engineering Society and field engineer of the Ohio Good Roads Federation.

Society to List Leading Collections of Minerals

The Mineralogical Society of America is attempting to compile a list of the most important mineral collections, both public and private, in the United States and Canada, the intention being to publish this information in the form of a regional Directory in the *American Mineralogist.*

While the securing of the necessary data relating to the larger public collections housed in museum and institutions presents little difficulty, the task of collecting information upon the smaller private collections, either general or specialized, that exist on this continent is more formidable. It is believed that there probably exists, in various smaller centers and mining districts, a wealth of interesting and valuable mineralogical material, some of it possibly collected years ago and from localities no longer accessible, which is virtually unknown to the scientific world. It is of decided value and interest to the owners of such material that the existence of their collections should be recorded, both from the standpoint of the possible scientific value of the material and with a view of enabling the owners to establish contacts with mineralogists who may find themselves in their districts and desire to examine the collections.

Accordingly, the Mineralogical Society of America wishes to ask all readers of this announcement who may be mineral collectors, and who own either general or specialized collections, to kindly send their names and addresses, together with a brief note on the nature of their material, to the address given below. If the collection is specially rich in minerals of a particular mine, locality or district, this should be mentioned, as should also the inclusion of any specialized types, such as gems, meteorites, or other notable rarities.

Since the success of the survey being made will very largely depend upon the coöperation of those individuals in possession of this information, an earnest appeal is made for as full, complete and prompt replies as possible. Address all correspondence to Samuel G. Gordon, Philadelphia Academy of Natural Sciences, Logan Square, Philadelphia, Pa.

Fire partially destroyed the building housing the office, machine shop and storage room at the Wysong gravel plant near Traverse City, Mich., recently.

Financial News

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

Wolverine Cement 1930 Net Shrinks to $32,038

Wolverine Portland Cement Co. reports for year ended December 31, 1930, net profit of $32,038 after all charges and taxes, equal to 32 cents a share on 100,000 shares (par $10) of capital stock, against $81,809—or 81 cents a share—in 1929. Current assets as of December 31 last, were $508,499 and current liabilities, $21,308 as compared with $658,229 and $35,157, respectively, at close of previous year. Profit and loss surplus was $163,705, compared with $198,115.

U. S. Gypsum Earns More in 1930 Than in 1929

Net income of the United States Gypsum Co. for the year ended Dec. 31, 1930, was $5,408,685, after depreciation, depletion and federal income taxes, equal after preferred dividends to $4.01 a share on the common stock now oustanding, compared with $5,102,305, or $3.98 a share, on a slightly smaller amount of stock in 1929.

During the year the company expended $4,433,018 for plant additions, including $2,898,328 for acquiring new properties, for which capital stock was issued to the amount of $2,672,458 and $316,870 was paid in cash.

"Although the immediate outlook for an improvement in building is not encouraging, and a slow recovery is indicated, the position of the company as to properties, products, distributive faculties and organization, justifies the expectation of a reasonably satisfactory year for 1931," said President Sewell L. Avery, in issuing his annual report to the stockholders.

"The serious decline in building for the year, which curtailed the demand for all commodities at all mills, was met by low manufacturing and distributing costs, a wider line of products, improved market conditions and a substantial contribution to earnings from new mills completed during the previous year."

In 1930 the company entered the metal-lath field, through acquisition of two companies, the insulating board field through purchase of a plant and also bought two lime plants. It bought a gypsum property in Canada and widened its lists of products by sales of colored sheet tile, pulp board and mortar colors.

Reveal Atlantic Gypsum Plans for Refinancing

Financial backers of Atlantic Gypsum Products Co., together with investment bankers who sold the first-mortgage bonds of this company, have prepared and issued to bondholders a proposed plan for readjustment of the present financial structure of the company and for its further financing.

Due to severe competitive conditions in the gypsum industry, and latterly to depression in the building trades, Atlantic Gypsum has been forced into a top-heavy financial structure with a resultant excessive annual interest load. In carrying this load to date and continuing in operation through a long period of adverse conditions, it has exhausted its working capital.

To meet this situation the proposed plan offers to bondholders either new securities (bonds and common stock) in the readjusted company, or cash. The supporters of the plan also underwrite the subscription providing the necessary new money, although the subscription is offered pro rata to all holders of interest-bearing securities.

If the total amount of bonds (including present large holdings by the supporters of the plan) accepting either option is sufficient to make the plan operative, a comparable offer will be made to holders of all other interest-bearing securities.

Response to date from bondholders indicates that the proposed plan can be made effective.

Upon the completion of the readjustment and refinancing, and if the plan becomes operative, the company will be placed in a strong current position, and free from practically all the present interest load, unless earnings from operations are substantial. With the company's plants in excellent physical condition, and with low operating costs made possible by improvements of the last two years, the company should be in a position to benefit substantially from operations under improved building conditions.

Alpha Fails to Cover Dividend Requirements

Alpha Portland Cement Co. reports for year ended December 31, 1930, consolidated net income of $1,248,353 after depreciation, federal taxes, etc., equivalent, after dividends on 7-per cent preferred stock, to $1.56 a share on 711,000 no-par shares of common stock. This compares with $1,815,018, or $2.35 a common share, in 1929.

Consolidated income account for the year ended December 31, 1930, compares as follows:

	1930	1929
Net sales	$9,936,820	$11,368,968
Expenses	7,366,812	8,336,699
Operating profit	$2,570,008	$3,032,269
Other income	185,842	307,297
Total income	$2,755,850	$3,339,566
Depreciation	1,337,497	1,299,548
Federal taxes	170,000	225,000
Net income	$1,248,353	$1,815,018
Preferred dividends	140,000	140,000
Common dividends	1,599,750	2,133,000
Deficit	$491,397	$457,982

Missouri Portland's Net Equals $4.02 per Share

The Missouri Portland Cement Co. reports for the year ended December 31, 1930, net profit of $1,205,832 after depreciation, depletion and federal taxes, equivalent to $4.02 a share (par $25) on 299,284 shares of capital stock. This compares with $1,312,987, or $4.38 a share in 1929.

CURRENT DIVIDENDS

COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE	COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE
Alpha Portland Cement	Preferred	$1.75 qr.	Mar. 2	Mar. 14	Lehigh Portland Cement	Preferred	$1.75 qr.	Mar. 14	Apr. 1
Canada Cement Co	Preferred	$1.62 ½ qr.	Feb. 28	Mar. 31	Material Service	Common	$0.50 qr.	Feb. 15	Mar. 1
Canada Paving & Supply	1st Pfd.	$1.75 qr.	Feb. 20	Mar. 1	McWilliams Dredging	Common	$0.37 ½ qr.	Feb. 20	Mar. 1
Cleveland Quarries	Common	$0.75 qr.	Feb. 14	Mar. 1	National Gypsum	Preferred	$1.00 qr.	Mar. 20	Apr. 1
Cleveland Quarries	Common	$0.75 extra	Feb. 14	Mar. 1	Owens-Illinois Glass	Preferred	$1.50 qr.	Mar. 16	Apr. 1
Consolidated Sand & Gravel	Preferred	$1.75 qr.	Jan. 31	Feb. 16	Standard Paving & Material	Preferred	$1.75 qr.	Jan. 31	Feb. 16
Fitzsimmons-Connell Dredge & Dock	Common	$0.50 qr.	Feb. 20	Mar. 1	Standard Paving & Material	Common	$0.50 qr.	Jan. 31	Feb. 16
General Asphalt	Common	$0.75 qr.	Mar. 2	Mar. 16	Superior Portland Cement	Class A	$0.27 ½M	Feb. 23	Mar. 1
General Refractories	Common	$1.00 qr.	Feb. 10	Feb 25	U. S. Gypsum Co	Preferred	$1.75 qr.	Mar. 14	Mar. 31
Great Lakes Dredge & Dock	Common	$0.25 qr.	Feb. 5	Feb. 14	U. S. Gypsum Co	Common	$0.40 qr.	Mar. 14	Mar. 31
Great Lakes Dredge & Dock	Extra	$0.25 qr.	Feb. 5	Feb. 14	Warner Company	Common	$0.50 qr.	Mar. 31	Apr. 15
International Cement	Common	$1.00 qr.	Mar. 11	Mar. 31	Warner Company	1st Pfd.	$1.75 qr.	Mar. 14	Apr. 1
International Salt	Common	$0.75 qr.	Mar. 16	Apr. 1	Warner Company	2nd Pfd.	$1.75 qr.	Mar. 14	Apr. 1
					Worcester Salt	Preferred	$1.50 qr.	Feb. 7	Feb. 15

Traffic News and Comment

Recent I. C. C. Decisions

Cement

The commission by Division 5 has decided that the rate on cement from Alsen, N. Y., to Newark Heights, N. J., is unreasonable to the extent it exceeds 12½ cents, and has awarded reparation in Docket No. 23,723, North American Cement Corp. v. C. of N. J. et al.

Interveners, Missouri Portland Cement Co., and Dewey Portland Cement Co., have petitioned the commission for reopening Docket No. 22,-239, Ash Grove Lime & Portland Cement Co. of Nebraska v. C. & N. W. et al., and consolidation of this case with No. 22,691, Dewey Portland Cement Co. et al. v. A., T. & S. F. This petition has been denied.

The commission has reopened Docket No. 22,561, Texas Cement Plaster Co. v. C. of Ga. et al., for reconsideration on the record as made.

Sand and Gravel

The commission has found the rate of $1.00 per net ton on sand and gravel from Wolcottville, Ind., to Detroit, Mich., unreasonable to the extent it exceeded 75 cents and has awarded reparation in Docket No. 22,855, Neal Gravel Co. v. Wabash.

Slag

Upon the petition of the defendants and respondents in Dockets 17,517, rates on chert, clay, sand and gravel within the state of Georgia, and 19,512, Birmingham Slag Co. v. A. G. S. et al., the commission has modified finding and order in 122 I. C. C. 133 and supplemental report and order in 140 I. C. C. 85, to the extent of not requiring the rates prescribed to be maintained on ground open-hearth basic slag, or basic phosphate slag.

Examiner's Reports

Ground Limestone

Examiner J. O. Cassidy proposes that the commission find unreasonable the rates on crushed, ground, pulverized and agricultural limestone from Waukesha, Wis., to destinations in Michigan to the extent they exceeded, exceed or may exceed rates based on the Michigan intrastate scale with the additions of arbitraries for joint line movements as provided under that scale; that the maintenance of intrastate rates from Michigan producing points to destinations in Michigan which are lower, distance considered, than the rates from Waukesha to the same points, is and will be unduly prejudicial to complainant and unduly preferential of its competitors at the Michigan producing points, and that it award reparation in Docket No. 23,609, R. H. Smelter v. Ann Arbor et al. The single-line scale is shown below with rates shown per net ton. A 12-cent arbitrary is added for two-line hauls and 20 cents for three-line hauls.

Miles	Rate	Miles	Rate
40	$1.15	180	$1.70
55	1.25	200	1.75
70	1.30	220	1.80
85	1.40	240	1.85
100	1.45	260	1.90
120	1.55	280	1.95
140	1.60	300	1.95
160	1.65		

Rate-Committee Dockets

TRUNK LINE ASSN.

Fluxing Stone

Carriers propose to reduce the rate on fluxing stone, c. l. min. wt. from Richville, N. Y., to Dexter, N. Y., from $1.01 per gross ton to 95 cents per gross ton, to meet motor-truck competition. Docket No. 26,000.

Ground Limestone

Reduced rate to meet motor-truck competition is proposed on limestone (ground, precipitated or pulverized), and limestone dust, c. l. min. wt. 60,000 lb., from Lime Crest, N. J., to Rutherford, N. J., to 6 cents per 100 lb. The present rate is 7 cents on a c. l. min. wt. of 50,000 lb. Docket No. 25,984.

Plaster

Reduced rates to meet motor-truck competition from Carteret and Tremely, N. J., to L. I. R. R. points are proposed by carriers to apply on plaster and related articles, and plasterboard. Proposed rates are shown in cents per 100 lb. Docket No. M-1,666.

To	Plaster, Etc.	Plaster-board
Group A	11 cents	13 cents
Group B	12 cents	14 cents
Group C	14 cents	16 cents
Group D	16 cents	18 cents

CENTRAL FREIGHT ASSN.

Agricultural Lime

Carriers propose to revise the rates on agricultural lime, c. l. min. wt. 50,000 lb., from Barberton, Ohio, to points within the state of Ohio, on intrastate movement only, on a lower level than that now in effect which approximates 60 per cent of sixth class. A few representative rates are shown below. A complete list will be furnished on request. Present rates are shown in cents per 100 lb., proposed rates per net ton. Docket No. 27,519.

To	Present	Proposed
Ada	$0.09½	$1.40
Amsterdam	.07½	1.10
Attica	.08	1.20
Bainbridge	.11½	1.80
Climax	.08½	1.30
Elhart	.06½	.90
Haskine	.10	1.40
Winchester	.12½	1.90
Zanesville	.09	1.40

Shippers are seeking reductions in the rates on agricultural lime from Scioto, Ohio, to destinations in Ohio, c. l. min. wt. 30,000. A few representative rates in cents per 100 lb. are shown below. Docket No. 27,540.

To	Present	Proposed
Bayard	$0.15	$0.11
Carrothers	.11	.07
Castalia	.12½	.07½
Drakes	.12	.09½
Falls Jct.	.14	.10
Lordstown	.16	.11
Slater	.10½	.07½
Tontogany	.12½	.07½

Shippers at Cold Springs, Ohio, are asking for reductions in the rates on agricultural lime, c. l. min. wt. 30,000 lb., to destinations in Ohio. Representative rates per 100 lb. are shown below. Docket No. 27,543.

To	Present	Proposed
Circleville	$0.10	$0.08
Lancaster	.10½	.08½
Junction City	.11	.08½
Crooksville	.11½	.08½
Ellis	.11½	.10½
Uhrichsville	.12½	.12
East Liverpool	.13	.11½

Fluxing Stone

A reduction in the rate on fluxing stone, c. l. min. wt. from Keeport, Ind., to Youngstown, Ohio, from $4.80 per net ton to $1.76 per gross ton is proposed by shippers. Docket No. 27,541.

Gravel

Carriers propose to establish on gravel, c. l. min. wt. from East St. Louis, Ill., and St. Louis, Mo., to Cold Brook, N. B., Canada only, a rate of $9.00 per net ton. This is a competitive rate and will not apply to intermediate points. The present rate is 76 cents per 100 lb. Docket No. 27,641.

Sand

A reduced rate on grinding sand, c. l. min. wt., from Butler, Pa., to Renfrew, Pa., of 60 cents per net ton, is requested by shippers. At present the rate of $1.17 to Pittsburgh is applicable under the intermediate rules. Docket No. 27,567.

WESTERN TRUNK LINE

Ground Limestone

It is proposed to increase the c. l. min. wt. on limestone (crushed or ground) from White Bear, Mo., to points in Ind., Mich., and Ohio shown in Item 1,430-A of W. T. L. Tariff 58-N, from 40,000 lb. to 60,000 lb. Docket No. 3,089-K.

Sand

At present various descriptions of sand are shown in tariffs. It is proposed to amend all commodity descriptions on sand that now specify molding sand or are qualified to exclude molding sand, to make the same reference to core sand. The following definite commodity descriptions, exclusive and inclusive, are proposed: "Rates apply on sand, other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, molding or silica." Rates apply on sand, viz.: Blast, core, engine, filter, fire or furnace, foundry, glass, grind-

ing or polishing, molding or silica. Docket No. 7,529.

SOUTHERN FREIGHT ASSN.

Feldspar

In lieu of the present class rates it is proposed to establish a proportional rate on feldspar in packages or in bulk, c. l. min. wt. 50,000 lb. from St. Louis, Mo., and East St. Louis, Ill., to Jackson, Miss., of $5.20 per net ton. Docket No. 53,993.

Plaster

It is proposed to establish in Agent Glenn's Florida Intrastate Commodity Tariff, a mixed carload rule permitting shipments of plaster and building blocks to be shipped in mixed carloads on same basis as now provided in tariffs governed by Note "A" of Agent Dulaney's Exceptions to the Southern Classification. Docket No. 53,858.

Soapstone and Talc

Shippers are asking for reduced rates on soapstone and talc, c. l. min. wt. 50,000 lb., from Chattanooga, Tenn., to the Ohio River crossings, Cincinnati to Cairo, inclusive, when for beyond, at $2.39 per net ton, and to Chicago, Ill., of $4.80 per net ton. Docket No. 54,047.

SOUTHWESTERN BUREAU

Cement

Shippers are asking for the establishment of Column 17½ basis of rates on Portland cement finish or topping for floors or walls (mixtures of cement and sand or other aggregates not exceeding 3 per cent of dry color), c. l. min. wt. 40,000 lb., from, to and between points covered by S. W. L. Tariffs 151, 152 and 154 and related tariffs. There is considerable controversy as to the proper rating of this commodity. In some cases carriers are insisting on the application of Class C (cement building compound), see Item 4, page 147, Western Classification 6, while Chairman Fyfe of the Western Classification Committee has stated that in his opinion the stucco rate is proper. Views on this subject have been expressed and have previously been presented to the carriers in S. W. F. B. Docket 17,638. Under this docket the stucco rates (gypsum-plaster rates) were approved subject to securing fourth-section relief. This relief was not granted by the Interstate Commerce Commission and, as a result, the shipper of this commodity is experiencing great difficulty in selling his products in Southwestern territory. While the 17.5-per cent basis suggested is higher than the basis previously approved, shippers are agreeable to accepting this figure for the sake of securing a uniform basis and relieve the present very unsatisfactory situation by reason of numerous controversies encountered in determining freight charges on this commodity. Docket No. A-470.

The carriers propose to establish on cement (hydraulic, Portland or natural), c. l. min. wt. 50,000 lb., except where the marked capacity of car used is less, the actual weight, but not less than 40,000 lb., will apply. Carriers will not accept orders for less than 50,000 lb. from Hannibal, Mo. From St. Louis to Scale 4, Oklahoma territory, rates are on the basis of the average of Scales 3 and 4 (8,182 Scale) rates; from Hannibal, Mo., to same destination territory, rates are on basis of Scale 4 rates and on account of having routes with the C., B. & Q. through Kansas City, there are fourth-section departures, Hannibal versus St. Louis. Inasmuch as the commission ordered in average of Scales 3 and 4 rates from Prospect Hill and carriers voluntarily spread it to other St. Louis rate points and now contemplate the same basis from Marquette, it is stated that it will be in order that the same basis be applied from Hannibal, Mo. Docket No. 22,281.

Plaster

It is proposed to establish Column 17½ basis of rates on plaster finish coat (inside), (mixture of Keene's cement, lime or gypsum plaster, separately or combined, with not exceeding 3 per cent of dry color) c. l. min. wt. 40,000 lb., from, to and between points covered by S. W. L. Tariffs 151, 152 and 154 and related tariffs. At the present time this traffic is moving under Item 9,612, Sup. 116, S. W. L. Tariff 1-Q, and Item 4,096, S. W. L. Tariff 15-series, and similar items in other tariffs. The present rates, however, will not permit free movement of this commodity because of competition encountered at destination when the plaster finish coat is mixed on the job. Shippers feel that rates on this commodity should be no higher than the rates on gypsum plaster, as the commodity is nothing more than plaster with a small percentage of dry color or, in some cases, lime mixed with dry color. Docket No. A-471.

TEX.-LA. TARIFF BUREAU

Cement

Shippers propose the establishment of rates based on Scale 3, I. C. C.

(Continued on page 90)

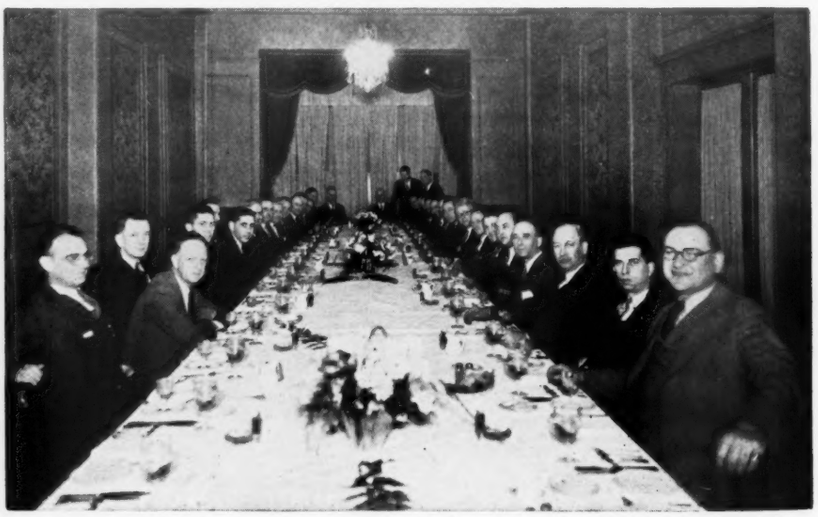
Iowa Machinery Concern Enjoyed Successful Year

The Speeder Machinery Corp., of Cedar Rapids, Iowa, was host to its salesmen and dealers during the annual sales conference held recently. Dealers representing almost every state and many Canadian provinces were in attendance.

O. W. Crowley, executive secretary of the Associated General Contractors of America, Central Branch, spoke on the subject, "Coöperation Between Your Salesmen and the Local Secretaries of the A. G. C." Alden Perrin, of the Gillette Publishing Co., spoke on the subject, "Using Advertising as a Selling Help."

Sales Manager Deal was authority for the statement that the Speeder Company had wound up the most successful year in its history. More machines were built and shipped than in any previous year. Stocks were completely cleaned up on January first. There was not a single machine left in the hands of a dealer anywhere in the United States or Canada and only one completed machine remained at the factory. Not a single repossessed machine was in the hands of either the factory or any dealer. The production department has been running two shifts per day for several weeks and there is by far the largest amount of spring business already signed up that the company has ever had at one time.

Much interest has been manifest in the new Speeder Whirlwind, a ⅜-cu. yd., full-swing machine, patterned after the already well-known ½-cu. yd. Speeder. The big ¼-cu. yd. machine came in for much attention and some rather startling demonstrations were staged with the big brother of the Speeders.



The Speeder Machinery Co. banquet for its salesmen and dealers.

Review of Foreign Practice

Effect of Chlorides on Strength, Set of Cement

The effects of calcium chloride, barium chloride and beryllium chloride on normal cement and on cement ground without the addition of gypsum are extraordinary diverse. This phenomenon can be most clearly recognized in the investigations in which beryllium-chloride solution is used as the mixing water. While in these tests the cement ground without gypsum showed only slight variations from the standard in strength properties, the effect of this salt on the normal cement are vividly reminiscent of the destructive action that sugar solutions exercise on cement.

Addition of calcium chloride and barium chloride shows only a rather slight effect, which in general changes the properties of the cement as much to the good as to the bad side, and it is only in the temperature curves that the salt makes itself noticeable. Thus the second maximum is almost always raised, a sign that during the setting process chemical reactions take place between the salt and the cement. While calcium chloride also raises even the first maximum considerably, the curves with barium chloride at this point remain equal to those with pure water. It can be seen from this that the material more closely allied chemically to the cement—the calcium chloride—reacts immediately after being brought together with any constituents of the cement, while the barium chloride can only react after the first reaction is completed. This is a new proof that in the setting of the cement we have to deal with two quite different chemical processes. The assertion that the heat generation progresses steadily to a peak is not correct. Rather, there are to be observed in most heat curves two maxima and a minimum lying between them. The depth of this minimum is only dependent, mainly, from the height of the first maximum. The first reaction is in general very short and falls off rather quickly, but this is obscured by the second reaction then gradually setting in and is therefore not to be recognized on the temperature curve.

The action of the calcium and barium chlorides on the cement ground without gypsum is, on the other hand, almost exclusively of favorable nature, and in fact the properties are considerably improved. Mixed with distilled water it remains always behind the properties of the standard cement, but in appropriate concentration of the mixing solution one finds that out of the rapid-setting cement without gypsum a slow-setting cement is formed, and that the strength values reach or even exceed those of the standard cement. It seems almost as though the salts in a certain way take over the role of the lacking gypsum in the setting and hardening process.

It seems premature to say anything here concerning the nature of the chemical processes in the action of the chlorides on the cement. There must first be carried out a further series of investigations which would be conducted along similar lines. Perhaps such investigations could also throw light on the rôle that gypsum itself plays in the setting and hardening of cement.—K. Fill, report of investigations at Mineralogisches Institut, *Zement* 19:1178-84 and 1206-8, Dec. 11 and 18, 1930.

Concrete Stronger When Fine Stone is Employed

On the basis of a comparatively limited number of investigations it can be stated that even small additions of finely-crushed stone to ordinary sand, for example, one part in five, effect a considerable increase in the strength of fluid concrete. This increase is greater when high-test special cement is used than when the standard Portland is used; also, the increase seems to be of greater import as the size of the stone decreases. The author points out that the use of fine stone on any particular construction job, however, will depend on economic factors such as location and accessibility of the job, price of the stone available, etc., which sometimes favor the use of stone and at other times favor obtaining the strength increase through other means such as the use of specially prepared gravel aggregates or the use of special cement, etc.—Dr.-Ing. Luz David in *Zement*, 20:32-37, Jan. 8, 1931.

Wide Variety of Quarry Materials Are Utilized

The Ravin-Blanc quarries of the Societe des Chaux et Ciments Oranais at Oran, France, contain a considerable variety of materials, and utilization of all of them presents many problems. The quarry is worked in four benches. The upper bench, 9 meters thick, contains a friable calcareous sandstone at the top, which is either crushed and sold as sand and gravel, or is screened to remove most of the quartz grains and sold for use as viticultural lime. Below this is a hard sandstone which is crushed for concrete sand and gravel. The second bench, 2 meters thick, is a stratum of sand which is sold for mason work. Experiments have also been made with the manufacture of sand-lime brick from this material.

Below this are two benches of alternating lime and marl, the upper bench, 13 meters thick, being white stone and the lower bench, of the same depth, green. The latter contains organic impurities which burn, so that this stone can be calcined with only about one-half the fuel required for ordinary limestone. All the limestone is calcined, and much is sold for agricultural and viticultural purposes. An interesting stratum in the upper bench is of diatomaceous earth, which is sold (some of it in the United States) for the manufacture of refractory, abrasive and insulating materials, and for concrete admixture. The marls, easily separated from the limestone because of the excellent stratification and their differing physical properties, contain much silica, and are lightly calcined to an artificial pozzuolana which is admixed with lime and cement. In the operation of the plant, the limestone screenings are pressed into briquets and calcined along with the marl, so that all the output of the quarry is utilized. L. M. Heyler in *Revue des Materiaux de Construction* No. 252, pp. 341-343, Sept., 1930.

The Effect of Improved Aggregates in Concrete

Through a number of investigations and comparison of their results with earlier investigations it has been established that there is a considerable increase in the compressive and bending strengths of concrete due to the use of improved aggregates. Permeability tests show further that concrete with a cement content of 300 kg. per cubic meter are thoroughly permeable when natural aggregates are employed but, with the use of improved aggregates, is practically impervious to water.

According to the specifications of the German Committee on Reinforced Concrete, the compressive-strength is taken as indicative for judging the quality of concrete. The employment of the more expensive concrete with improved aggregates leads only to a lessening of quanities and therewith of the cost only when high concrete strengths can be used for the proportioning. The utilization of improved aggregates is nevertheless very highly recommended also when there is no saving in quantities to consider, particularly if besides strength there is a need for the least possible permeability and for the greatest possible limitation of the danger of shrinkage cracks.—Dr.-Ing. Paul Hertle (from dissertation "Influence of the Employment of Improved Aggregates on the Quality and Costs of Concrete," Zementverlag, Charlottenberg 2, 1930), in *Zement*, 19:1087-90, 1117-21, 1141-4 and 1167-9, Nov. 13, 20, 27 and Dec. 4, 1930.

Recent Patents

AMERICAN

Cement and Concrete

Concrete-distributing apparatus. Arthur E. Robinson, Plainfield, N. J., assignor to Ransome Concrete Machinery Co., same place. No. 1,792,710.

Chlorine-treated (hydraulic) cement. Hans M. Olson, Fallbrook, Cal. No. 1,792,755.

Portland-cement-modifying composition (coloring and hardening composition). Maximilian Toch, New York, N. Y., assignor to Standard Varnish Works, same place. No. 1,793,143.

Crushing and Grinding

Grinding-mill. Richard S. Iglehart, Springfield, Ohio, assignor to Bauer Bros. Co., same place. No. 1,792,841.

Method of grinding. Erwin Kramer, Berlin, Germany. No. 1,793,098.

Screening and Separating

Pneumatic separator (separating unsized material into fine and oversize material). William M. Barker, Canton, Ohio. No. 1,792,962.

Miscellaneous

Beetling mill with closed casing. Erwin Kramer, Berlin, Germany. No. 1,793,096.

Disintegrating-mill beetle. Erwin Kramer, Berlin, Germany. No. 1,793,097.

Mining-machine. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co., same place. No. 1,792,499.

Excavating

Hydraulically-operated shovel. Walter Ferris, Milwaukee, Wis., assignor to Bucyrus Co., South Milwaukee, Wis. No. 1,793,438.

FOREIGN

Cement

Rotary kiln for burning cement. Axel Waldemar Jensen. German 518,621.

Process and apparatus for introduction of admixtures for raising the strength of cement and the like. G. Polysius Akt.-Ges. German 517,652.

Color composition for cementitious products. Herbert E. Bedwell. Canadian 308,454.

Crushing and Grinding

Pulverizing machine. The Jeffrey Manufacturing Co. Ltd. (Walter J. Armstrong.) Canadian 308,546.

Disintegrating mill with horizontal shaft. Franz Pirwitz Nachfolger. German 517,651.

Cooling device for mills for grinding pulverulent or granular masses. Vickers-Armstrong Ltd. German 517,653.

Drying

Air heater for drying installations. Bruno Wagner. German 518,162.

Drying apparatus. U. Pornitz & Co. Akt.-Ges. German 517,715.

Drying and hardening apparatus. Rudolf Wiedemann. German 517,908.

Rotary drier. Deutsche Babcock & Wilcox Dampfkessel-Werke Akt.-Ges. German 517,716.

Conveyor for feeding rotary or table driers. Mitteldeutsche Stahlwerke Akt.-Ges. German 519,718.

Lime

Apparatus for making building mortar, including lime hydrating tank. Harold D. Robertson. Canadian 308,486.

Material-Handling

Conveying apparatus. The Mathews Conveyor Co. Canadian 308,551.

Process for conveying material. Montis Akt.-Ges. German 517,707.

Extension belt conveyor. Adolf Fehrmann. German 517,708.

Movable shaking conveyor connection. Gebrueder Hinselmann G. m. b. H. German 517,882.

Pump for conveying concrete. August Wolfsholz Presszementbau Akt.-Ges. German 517,710.

Reciprocating conveying device. Compagnie des Mines de Roche-la-Moliere et Firminy Soc.-Anon. German 517,711.

Shovel drive for loading device. Rembrandt Peale. German 517,884.

Suspension cable for small overhead grab buckets. Willi Grossmann. German 517,885.

Overhead conveying device. J. Pohlig Akt.-Ges. German 517,886.

Conveyor for removing strippings, with crane and removable car buckets. Adolf Bleichert & Co. Akt.-Ges. German 517,887.

Unloading device for large storage bins. Adolf Bleichert & Co. Akt.-Ges. German 517,888.

Loading machine. Preparation Industrielle des Combustibles Soc. Anon. German 518,625.

Screw conveyor, particularly for pneumatic conveyors of pulverulent material. Claudius Peters. German 518,483.

Sacking

Process and device for closing sacks. Union Special Maschinenfabrik Ges. m. b. H. German 518,377.

Separating

Black-sand separator. Claude J. Rattray, William C. Peach, Clark Turner and Colonel E. Peach. Canadian 308,597.

Method of attaching filter cloth. Carroll M. Stanley and Franklin J. Evans. Canadian 308,610.

Filter leaf. Ernest J. Sweetland and Joseph V. Zenthoefer. Canadian 308,611.

Apparatus for separating pulverized materials. Gustav Plath. German 517,654.

Process and device for separating mixtures of different particle size according to the sedimentation process. Chemische Laboratorium fuer Tonindustrie und Tonindustrie-Zeitung Prof. Dr. H. Seger & E. Cramer G. m. b. H. German 517,960.

Unclassified

Process and apparatus for regulating or indicating the concentration of materials in liquids. Torsten Kalle. Canadian 308,473.

Manufacture of concrete pipes. George L. S. Richards. Canadian 308,484.

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Traffic News

(Continued from page 88)

Docket 15,151, on cement, including masonry cement, c. l. min. wt. 50,000 lb., marked capacity of car to apply where less, but not less than 40,000 lb., from New Braunfels, Dittlinger, Longhorn and Cementville, Tex., to Shreveport and points in group A. Cement rates on this basis are now in effect from the above points to the Texas-Louisiana border. In S. W. L. Tariff 168 rates are published to Shreveport from Houston, 16 cents based on 15,151 scale; 15 cents from Harrys and Eagle Ford, and 16 cents from North Ft. Worth. Present Class C rate is prohibitory and prevents shippers from operating in Shreveport market. Docket 366-TX.

TRANSCONTINENTAL BUREAU

Feldspar

Shippers are requesting a reduction in the present c. l. min. wt. of 80,000 lb., on feldspar from Keystone, S. D., to north Pacific coast points, in Item 1,130, Tariff 4-F. Docket No. 12,086.

Plasterboard

It is proposed to amend Item 1,245 (plasterboard), Tariffs 2-Z and 3-C (Eastbound), by adding a note reading: Shipments of plasterboard may be stopped in transit to partly unload, subject to rules and regulations as published in W. T. L. Tariff 213, supplements thereto or successive reissues thereof and other tariffs of individual lines, parties thereto, and lawfully on file with the commission. Docket No. 11,816.

Names Texas Distributor for Vibrating Screens

The Deister Machine Co. of Fort Wayne, Ind., has recently appointed the Browning-Ferris Machinery Co. of Dallas, Tex., as its representative for Texas in the sale of Plat-O vibrating screens.

Legal Information for Operators

Buyer Is Forced to Pay for Defective Machine

Generally speaking, a purchaser is bound promptly to cancel a contract of sale where the recession is based on the ground that the subject of the sale does not equal the guarantee given by the seller. Also, it is especially true that a payment made by a purchaser, after complaint that he is not satisfied, indicates that he did not promptly rescind the contract.

For instance, in Abram v. Arrighini, 232 N. W. 196, it was disclosed that in February a person named Artil purchased a concrete mixer on credit. Upon trial the mixer did not operate to Artil's satisfaction, and, with some cause for doing so, he complained to the seller. Parts of the mixer were sent to Chicago for repair and repairs were also made in Detroit. Although Artil complained that the mixer was not satisfactory, he paid $400 on his account in June, Finally, in September, Artil refused to make further payments and the seller filed suit to recover the balance due. Artil contended that he was not obligated because the mixer failed to prove equal to the guarantee given by the seller when the mixer was purchased. However, since Artil did not promptly rescind the contract, the Court held the seller entitled to recover the balance due, stating the following important law:

"Under defendant's (purchaser's) version he had a right, at one time, to rescind. That right survived mutual efforts to repair defects but called for prompt exercise, after plaintiff (seller) refused further coöperation, and was lost by delay and recognition of obligation to pay and by the payment of $400, after defendant was convinced that the mixer was no good. On June 8, defendant paid $400 on the mixer. He was then aware of all the claimed defects."

Equipment Installed by Lessee Not Removable

The general rule is that permanent buildings erected by a tenant on the leased premises are not removable as trade fixtures unless the lease expressly or impliedly reserves to the lessee the right to remove them. Moreover, when it is stipulated that structures, ordinarily removable by the tenant, shall belong to the landlord on the expiration of the term, the latter acquires ownership in such structures immediately on their annexation. In other words, the tenant cannot remove the article before the expiration of the lease nor can he affect the landlord's rights by undertaking to transfer or sell the fixtures to a third person.

For instance, in Roanoke Marble & Granite Co. v. Standard Gas & Oil Supply Co., 154 S. E. 518, the Roanoke Marble & Granite Co. leased certain property to a gasoline company. In the lease it was agreed between the parties that the gasoline company should use the leased land for the sole purpose of conducting and operating a filling station for the sale of gasoline, motor oil, and other commodities and accessories generally used for automobiles and commonly sold or handled by filling stations. Under the terms of the lease, the gasoline company had the right, by and with the consent and approval of the Roanoke Marble & Granite Company, to erect and install, in and upon the leased premises, buildings, structures, tanks, improvements, equipment, and appliances, and such structures were to belong to the granite company at the termination of the lease. The gasoline company became bankrupt soon after signing the lease and the trustee in bankruptcy attempted to remove the tanks and other equipment from the property.

It was contended by the trustee that the gasoline tanks were a trade fixture, and that it had a right to remove them at any time within the term of the lease. The granite company filed suit to prevent such removal. In holding the granite company entitled to retain all equipment on its property as its own, the Court said:

"Our conclusion is that where, by the lease, the tenant is given the right to install a large storage tank under the surface of the ground, connected by pipes with the railroad siding and surface pumps, to be used by him in maintaining a filling station during the term of the lease, and, on the termination thereof, such storage tank is to become, along with other buildings and structures, the property of the lessor, it partakes of the nature of a permanent fixture."

Settling the Question of Assignment of Funds

Considerable controversy has existed as to whether or not an assignment by a contractor in favor of a material man, of funds in the hands of another, is enforceable. Therefore, it is important to know that as a general rule an assignment, for a valuable consideration, of a sum of money due, or to become due, on an existing contract will, when notice is given to the debtor, operate as an equitable assignment of so much of the fund as is covered thereby, subject to all valid prior charges.

Moreover, an assignment of this nature need not be in writing. It may be written, or oral, or partly written and partly oral. In other words, no attention is paid by the Courts to mere matter of form. If the Court can clearly discern the purpose of the parties, it will give effect to the assignment regardless of the method by which such intention is expressed.

The latest case on this subject is Structural Gypsum Corp. v. National Commercial Title & Mortgage Guaranty Co., 151 Alt. 839. In this case it was disclosed that the Structural Gypsum Corp. had furnished $4,505 in materials to a contractor who had contracted to construct an apartment building. The gypsum company was entitled to file a mechanic's lien to secure payment but agreed to waive this right if the contractor would send a letter to a mortgage company, which held a mortgage on the building under construction, authorizing the mortgage company to pay $4,505 to the gypsum company out of money held for the contractor.

Later the gypsum company wrote the mortgage company calling the latter's attention to the order on the funds sent by the contractor. The mortgage company answered, saying:

"While we do not guarantee the payment of these orders, still we shall always have this record before us and will coöperate with your client in every way possible."

The gypsum company, in accordance with its agreement, refrained from filing a mechanic's lien upon the apartment building upon which the mortgage was given and subsequently lost its right to such a lien, and refrained from suing the contractor for the payment of the sum of $4,505.

Instead of paying this amount to the gypsum company the mortgage company paid all moneys to the contractor. The gypsum company sued the mortgage company for $4,505. In holding the gypsum company entitled to recover this amount the Court said:

"Any order, writing or act which clearly indicates that the assignor intended to make over a fund belonging to him, amounts in equity to an assignment of the fund. . . . Payment, after notice of the assignment, to any person other than the assignee, will not relieve the debtor of his liability to the assignee. Where an order is drawn on a particular fund and presented to the debtor, there is an equitable assignment, though the debtor refuses to recognize the assignment. . . . We are of the opinion that . . . there was an equitable assignment to the complainant (gypsum company) of the Church Construction Company's right in and to the unpaid balance due on said mortgage loan to the extent of $4,500, and that the mortgage company, having received notice of this assignment, must be considered to have held said $4,500 in trust for the complainant, and cannot avoid its obligation to pay the same to complainant because it thereafter paid the balance of said mortgage loan to the Church Construction Co."

Insurance Problems Discussed

Investing Surplus Funds in Insurance Companies

JOKINGLY it may seem that no business has money to spare today. In a literal sense, however, every going concern must have some free money as working capital and must, therefore, have a continuous problem of managing its funds.

Cash has played an increasingly important role among producing and manufacturing businesses. When merchandising passed beyond its original form of a direct exchange or bartering of goods, very little cash had to be kept on hand—just enough, for example, to meet current pay rolls or, at most, to get the benefit of discounts on purchases of supplies and materials.

Cash Reserves

Cash is now recognized, however, as an important reserve force. A cash reserve is desirable to bolster up bank credit or to help carry the overhead through dull seasons. Finally, many old established firms have accumulated a permanent surplus, over and above physical equipment, which is invested in bonds or other interest-earning securities and kept in a liquid form.

What does this have to do with insurance, though? Just this: many of the operations of life insurance companies are similar to those of trust companies and the fitting of these services to business is just being developed.

Bonds and Call Money

Business men have followed fairly uniform policies in handling the surplus funds or cash reserves of their corporations. From the end of the World War until about 1924, corporations were good bond buyers. The return on bonds was high, it was the chief form of new financing and new issues of the highest order were put away in manufacturers' strong-boxes. Then the great bull stock market blossomed out, bringing with it that recent miracle, "call money." Just a few years back, call money was an innocent little free service of bankers. If a manufacturer accumulated excess cash in his "off" season which would be needed in his next production period, his banker helped him to earn a modest return on the idle money. But, when interest rates went up to ten or twelve per cent or more, corporations stripped their bank balances, sold bonds, and loaning money to stock brokers for about five years was practically a department of every factory.

Conditions Today

Times are different now. Most forms of investment are in disfavor. The interest rate on call loans is so low as to rule out that use of surplus funds. There is almost a general strike against the purchase of mortgages because they are not liquid and can not be used as collateral. Except for the "cream," bonds have depreciated greatly in two years. Shares in some investment trusts, which should be an excellent form of surplus, have suffered where the managing trustees have used the trust to help favorite issues of their own.

Confidence in Insurance

The life-insurance companies have gained tremendously in public confidence since 1929, because their policies and contracts are practically the only investment paying its face amount and giving the full loan value on demand. As collateral, insurance is about the only paper on which an investor may obtain money in the midst of a money panic.

Life insurance is now getting into the investment field—not directly, of course. Insurers do not sell bonds, stocks or mortgages. They cannot issue a contract unless it insures a life in some form or other. Some of the most recent policies, though technically qualifying as life insurance, are chiefly valuable for their incidental aspects as shares in gigantic investment trusts.

How It Works

You can probably comprehend this service best if you picture the working of one of these modern contracts. Though necessarily we quote the individual rates of one insurance company, we are indicating a principle which is widespread.

The purchaser, let us say a manufacturer, makes a single deposit of $998 or multiples thereof. This buys a so-called one-year endowment policy. Since this is actually insurance it will be taken out on the life of the president or other officer, although no medical examination is required. If the insured officer dies within one year, the beneficiary gets $1,000 for every unit purchased. If, however, the insured lives to the end of one year, the original $998 becomes $1,000 and a $4 dividend is paid. After the first year, interest on the entire $1,000 is payable at 4.8 per cent as long as the money is left on deposit, and the principal itself may be withdrawn any time on demand.

Basis of Investing

The above plan and similar plans of other insurance companies are based on all the factors prerequisite to successful investment, which are:

Diversified experience,
Accurate information,
Fact-finding organizations,
Group judgment, and
Continuous attention.

To those who remember with longing the days of ten-per cent interest on call loans or marketable bonds, we may point out that 4.8 per cent is a fine rate of return, considering the safety and liquidity of the principal. For the private investor, there is no such thing as compound or even simple interest. Theoretically it is possible, but actually investment losses, in the long run, will eat up much of the earnings.

Million-Dollar Opinion

A capitalist recently invested a million dollars in a contract with an insurance company, and when asked why he did so he commented:

"My investigation of the plan of placing large funds with insurance companies for the purpose of safeguarding both income and principal proved to me that a better net return could be had than from many other methods.

"The investment committee of a large insurance company has much better facilities, is better trained, and has better judgment about the investment of funds that an individual. The great insurance companies are furnishing a most wonderful service to the public. It is not yet adequately appreciated."

Many lead at the half-way post who do not finish in the money. This is equally true of horses, men and investments. It is not temporary profits but long-run stability which determines financial success. On this basis we can recommend a study of life-insurance plans for the handling of savings and surplus funds.

Equipment Manufacturer Acquires N. Y. Company

The Gifford-Wood Co. of Hudson, N. Y., century-old manufacturers of elevating and conveying equipment, announces its absorption of the C. W. Hunt Co., Inc., West New Brighton, Staten Island, New York. The Gifford-Wood Co. will manufacture and sell the complete line of equipment formerly produced by the C. W. Hunt Co., Inc., and will operate that company as a division of the Gifford-Wood Co.

The C. W. Hunt Co. is one of the oldest and best known manufacturers of high grade material handling equipment for industrial and power plants. The line of equipment consists of pivoted bucket carriers, crushers, belt and flight conveyors for coal as well as a general line of elevators and conveyors for handling bulk material. Other products such as the Mitchell electric vibrating screen and various designs of chutes and gates, car pullers, etc., are also manufactured.

New Machinery and Supplies

Raw-Cement Mix or Coal Is Fed at Uniform Rate

The construction and operation of the new Huron feeders, manufactured by Huron Industries Inc., Alpena, Mich., is extremely simple, a feature which reduces to a minimum the amount of investment and maintenance required.

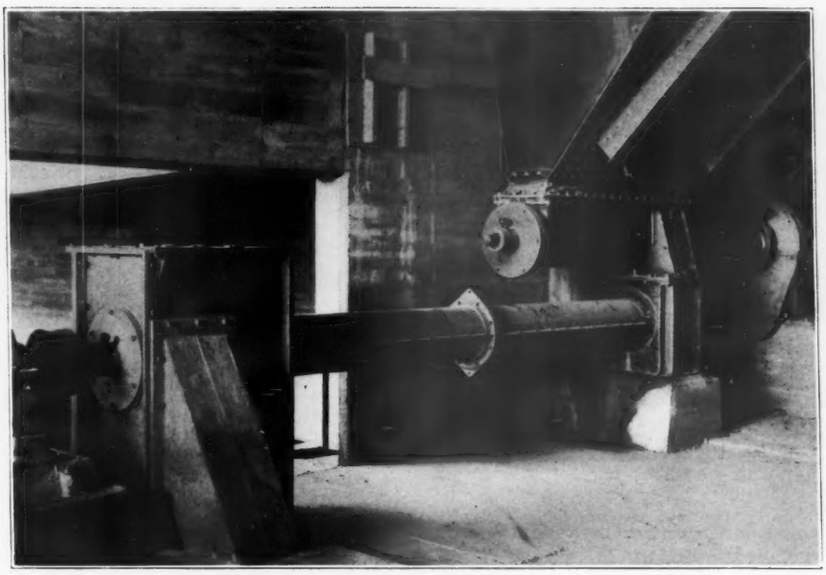
Each feeder consists essentially of a receiving box, a feeding box, three gear-driven conveyor screws, and a discharge box. There are no fine adjustments, no parts that are subjected to excessive wear, and no complicated parts that might get out of order and be difficult to replace. In fact, all the parts are of the kind with which operators of this class of equipment are entirely familiar.

The bin is bolted to and supported by a receiving box with a rectangular opening of sufficient size to permit an ample flow of material, taking into account the angle of the side walls of the bin. The receiving box is divided into two sections, and below the sections are two screw conveyors which work against one another. This arrangement causes the material conveyed by each screw to meet just above the feeding box. The latter is equipped with an overflow compartment, at the bottom of which the material is continually agitated by the incoming material, thus bringing the pulverized coal or raw mix to a uniform density and aerating it, the air being released and escaping through vent pipes up the sides of the bin. The conveyors are designed so there is sufficient material conveyed to the feeding box to keep a continual supply in the bottom of the box, from which it is conveyed to the discharge box by means of a screw. The latter is keyed to the drive shaft, which is connected to the upper conveyor shaft by a spur gear and pinion.

All possibility of arching or bridging-over of the material in the bin is prevented by the large area of the receiving box and the slope of the bin walls. Flooding is eliminated, regardless of the fluidity of the material, by use of double-flighted screw conveyors and by enclosing them for a short section just at the entrance to the feeding box. Also, the fact that the material is delivered to the feeding box from opposite directions has an important bearing on the elimination of flooding as well as on the maintenance of a uniform rate of feeding.

The rate of feed can be accurately determined by making a test run for a short period of time, and can be regulated by use of a variable-speed motor.

The equipment includes a shut-off gate for closing the bin, a regulating gate for varying the feed, and an adjustable baffle in the discharge box. The latter may be of either the gravity-feed type or the air-feed type, as specified.



Feeder handling dry raw mix to cement kilns.

To provide rigid and sturdy construction, together with accurate assembly and permanent alignment of shafts, semi-steel castings are used in building the receiving, feeding and discharge boxes and the conveyor pipe. The conveyor screws are of the standard type, and are renewable in sections.

Huron feeders are made in three sizes, with 6-in., 9-in. or 12-in. conveyors. Detailed drawings are supplied for each installation. Bins are not furnished.

Simple Lock Nut Easy to Install or Remove

An automatic lock nut, simple in design, highly efficient, and which fits any standard thread, has been placed on the market by the General Automatic Lock Nut Corp. of New York, N. Y. The nut, shown in the accompanying illustration, can not work loose and requires no washers. It is made in all sizes.

The simple, automatic lock nut.

According to the manufacturer, the nut costs no more than the ordinary high-grade nut and washer and is likewise easy and economical to maintain or remove.

The new lock nut is a single unit, employing no cotter pins. Built integrally with it is a locking pin. When applying the nut, this pin is engaged by the thread of the bolt, following the thread. This turns the pin at an angle and establishes a point of impingement against the bolt—the pin biting in and thereby maintaining the point of adjustment perpetually against vibration and shock.

The lock nut, however, may be removed with a wrench just as any ordinary nut. It may be put on and taken off repeatedly without damage to either pin, threads, nut or bolt.

Grizzly Crawler Loader Has Helical-Type Feed

Continuing a policy of constant study and improvement of its complete line of portable-loading equipment, Link-Belt Co., Philadelphia, Pa., announces the 1931 model Link-Belt grizzly-crawler loader, which is fully described in folder No. 1256, just published.

The 1931 grizzly has the improved helical-ribbon-type feeder, announced in 1930, with its cast-steel spiral which digs, lifts and conveys the material to the buckets, cutting a 7-ft., 7-in. swath in the material handled.

The power plant consists of a 30-hp. Buda gasoline engine, equipped with a governor to regulate the speed automatically; or a 20-hp. electric motor of standard specifications.

The elevator has a rated capacity of 1¾ cu. yd. per minute, with uniform feed, based on sand, stone and gravel, 1½ in. and smaller and similar materials.

Grizzly crawler loader.

A three-speed transmission gives the crawlers a speed of 30 ft. per minute, or 66 ft. per minute, in the digging direction, and 27 ft. per minute in reverse.

Driving machinery is housed in a dust-tight casing, partly filled with oil, which assures perfect lubrication of all parts.

New Worm-Gear Reducers for Small Motor Drives

A series of three small worm-gear speed reducers for small electric-motor drives up to seven-horsepower capacity has been developed by the W. A. Jones Foundry & Machine Co., Chicago, Ill.

These small reducers are almost identical with the heavy-duty Jones

Small worm-gear speed reducer.

worm-gear speed reducers except in size. The worm is made from a low-carbon, nickel-steel forging that is hardened to increase strength and wearing qualities and to provide for a low coefficient of friction. The wheel is made of a special nickel-phosphor-bronze alloy. The gear blank is dry sand cast and chilled, producing a casting of exceptional strength and load-carrying capacity with a minimum of friction. The teeth are generated to a very high degree of accuracy by specially designed hobs. The gear shaft, a high-carbon-steel forging, extends out on both sides of the housing so that machines can be driven from right- or left-hand side or both. A metal cap, or shaft guard, covers one shaft and is easily removed. Both the gear shaft and the worm shaft are mounted on Timken roller bearings.

Large stocks are kept in Chicago, Detroit, New York, Los Angeles and San Francisco. Authorized jobbers also carry stocks. Immediate delivery of machines "ready for use" is now possible. Bulletin No. 49 gives complete information and simplified instructions for ordering the right machine. It will be sent on request, upon application to the company.

Scrubber Removes Clay Balls and Soft Stones

Probably no equipment which has been perfected in recent years has met with such universal approval as the Allswede scrubber for the removal of clay balls and soft stone from gravel and crushed stone. A working model was exhibited at both the crushed-stone and sand-and-gravel conventions in St. Louis and dozens of operators inspected it and were enthusiastic over its possibilities.

The principle of the Allswede scrubber is the same as that of a ball mill, where everything softer than the hard stones are pulverized and pass out with the water. The perforations in the four cones shown are all of the same size and are sufficiently larger than the maximum size of material to be washed to permit it readily to pass through the machine. The steel balls are somewhat larger than the perforations in the cones, which assures them remaining in their respective compartments.

The standard scrubber is 5 ft. in diameter by 20 ft. long, divided into four compartments with one-half ton of forged high-carbon steel balls in each compartment. Sixteen feet of the shell is water-tight, equipped with heavy baffles and lined throughout. The last four feet of the shell has small perforations or slots, which permit the water and ground-up refuse to drain off. As the clean gravel is discharged from the lower end, it is treated with a spray of fresh water, which gives it a final rinsing.

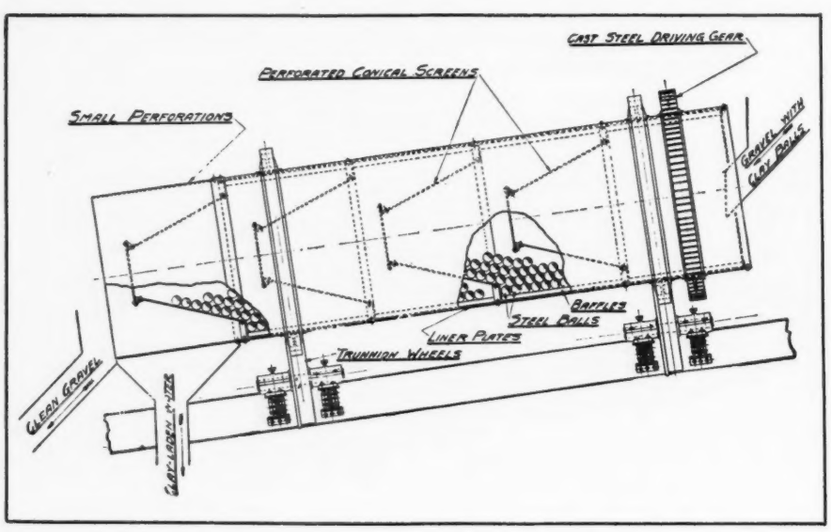
The machine is built for the heavy service for which it is intended and is riveted up like a steam boiler. It has a capacity of from one hundred to two hundred tons per hour, according to the amount of scrubbing required.

The Allswede scrubber was designed by William H. Allswede, president and general manager of the Hersey Gravel Co. of Hersey, Mich. The F. M. Welch Engineering Service, Inc., of Greenville, O., has acquired the manufacturing and selling rights.

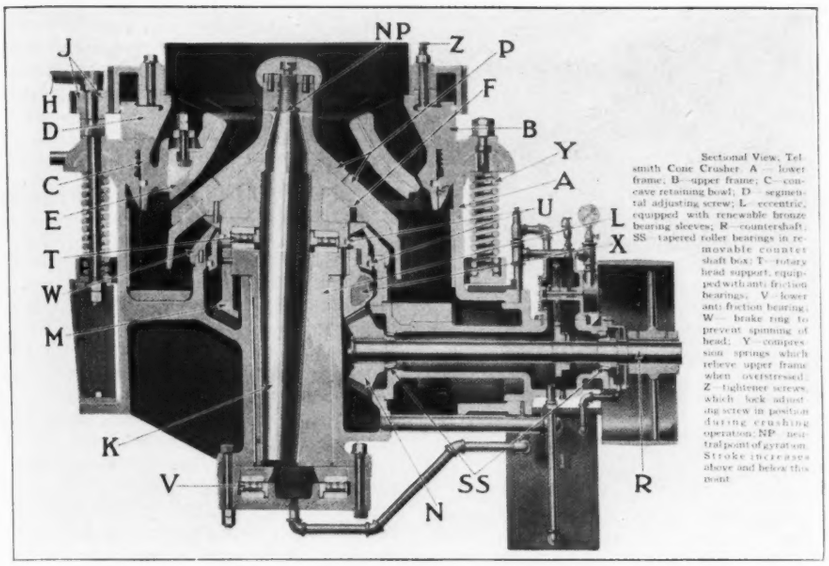
New Cone Crusher Makes Finer Sizing Possible

In recent years, there has been an increasing demand for finer sizing of crushed rock in the mining, quarrying and sand-and-gravel fields. When the ordinary coarse crusher is "set up close" for fine reduction, the rock fails to discharge as fast as it feeds downward into the lower crushing zone; and this fine aggregate gradually forms a non-yielding mass at the bottom of the head, choking the crusher. In many cases, valuable equipment has been ruined by attempts at excessive ratios of reduction.

The new Telsmith cone crusher, recently introduced by the Smith Engineering Works, Milwaukee, Wis., obviates this difficulty. In this machine, the conical head gyrates so rapidly that every piece of rock is pinched several times during the progress through the crusher. Very little oversize material reaches the discharge opening. The spring release of the upper frame effectively checks packing and eliminates danger of breakage by tramp iron. The enormous bottom diameter of the head and the long head movement likewise operate



Scrubber employing steel balls for cleaning materials.

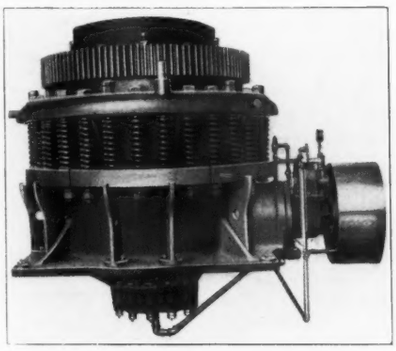


Sectional View, Telsmith Cone Crusher. A—lower frame; B—upper frame; C—concave retaining bowl; D—segmental adjusting screw; L—eccentric, equipped with renewable bronze bearing sleeves; R—countershaft; SS—tapered roller bearings in removable counter shaft box; T—rotary head support, equipped with anti-friction bearings; V—lower anti-friction bearing; W—brake ring to prevent spinning of head; Y—compression springs which relieve upper frame when overstressed; Z—tightener screws, which lock adjusting screw in position during crushing operation; NP—neutral point of gyration. Stroke increases above and below this point.

Explanatory cross-section of the cone crusher.

to prevent any choking action, even under a heavy accumulation of hard rock.

The axial line of the eccentric intersects the axis of the crusher at a point just above the feed level. The gyration of the head is therefore longest at the bottom, diminishing to a slight movement at the point of feed, but increasing again in the projecting portion of the head and the mantle lock, which extend above the feed opening.



The new cone crusher.

The projecting "knob" agitates the feed; and prevents bridging of the larger rock in the receiving hopper. The reduced stroke at the point of feed automatically regulates the flow of rock into the bowl, preventing overfeeding and choking. The vigorous stroke of the head, increasing in length towards the bottom of the bowl, breaks even the hardest deposit very effectively.

The Telsmith cone crusher discharges by gravity, through the three-arm bottom spider. The countershaft box and spider arms are protected by steel shields. The discharge chute is independent of the crusher structure, and may be attached at any desired position. There is no built-in discharge chute to hinder discharge, and there is no centrifugal action to wear out the discharge chute.

All bearings in the crusher are lubricated by force-feed, with oil pressure gauge and automatic relief valve to regulate the oil pressure. The oil pump is of the self-priming internal-gear type, driven by cut spur gears, which are inclosed and run in oil.

New Welding Rods Made from Manganese Steel

The practice of welding for hard surfacing, reclamation and repair of equipment parts is being adopted rather widely, and there are enough successful uses for welding of this sort to justify the opinion that for numerous applications it has come to stay.

Several years ago, because no existing welding rod was satisfactory, the research department of the American Manganese Steel Co. developed the Amsco manganese-steel welding rod. Its performance was so remarkable that it is being sold to customers who have a need for it, and all reports are very flattering. The composition has a manganese content of from 13½ to 14 per cent. This, together with other important elements, gives a deposit (with the electric arc-welder) equal in toughness and wear resistance to manganese steel. It may be used for repairing or building up either manganese-steel castings or other steels. It is stocked in A. S. & W. gauge No. 5 (0.207-in.), 36-in. long.

The manufacturer will supply trial lots of this rod without charge. Address the company at Chicago Heights, Ill.

Flue Dust Returned to Rotary Kiln by Feeder

The object of the Minogue flue-dust feeder, manufactured by Manitowoc Engineering Works, Manitowoc, Wis., is to return flue dust to a wet-process rotary kiln underneath the load in the kiln at a point from the feed end where the entering material has been thoroughly dried. This is accomplished in a simple manner, making cement from material which would otherwise be thrown away, or entered into the feed end of the kiln and thus interfering with proper operation.

If the material is put into the feed end of the kiln in a dry state or fed in separately as a slurry the kiln shows a tendency to form mud rings. This is no doubt due to the fact that the flue dust has hydraulic properties since it is composed largely of finished cement. In some plants the flue dust is mixed right in with the slurry before it enters the slurry tanks. However, this is not at all practical where any appreciable percentage of the slurry will contain flue dust.

In addition to the saving in the cost of handling the flue dust in this way over the expense of disposing of it as a waste product, the flue dust adds to the output of the kiln. As far as is known, the kiln capacity is increased by the amount of cement produced from the flue dust and the loss of ignition of the flue dust is under 30 per cent. Furthermore, any increase in fuel consumption of the kiln due to making this flue dust into finished cement cannot be determined. The saving thus resulting from this equipment each year is claimed to be several times the cost of the flue-dust feeder.

Note that the flue-dust feeder is a means of introducing the flue dust back into the kiln. Each installation must be provided with means of feeding the flue dust to the feeder casing at a regular rate not exceeding the capacity of the feeder. The capacity of the flue-dust feeder is 70 lb. per kiln revolution.

The cement is in no way harmed by the introduction of this material as all the flue dust fed back into the kiln has come from the kiln itself and does not affect the chemical balance of the material fed to the kiln.

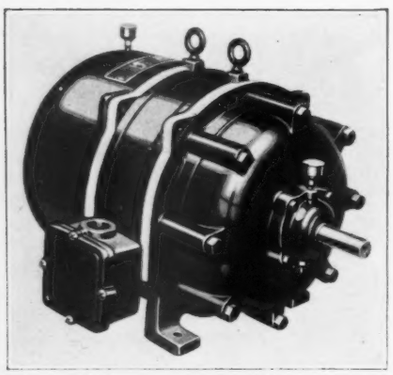
Flue-dust feeder on a 10-ft. rotary cement kiln.

Also, by feeding the flue dust underneath the load, the flue-dust feeder does not give a circulating load and does not seem to increase the dusting of the kiln. In other words, the same amount of flue dust is collected whether the feeder is operating or not.

Motor Safe for Use in Explosive Atmospheres

The Howell Electric Motors Co., Howell, Mich., announces the development of a new motor that bears the approval of the Underwriters' Laboratories for Class 1, Group D. This classification covers use in places where the danger of explosion due to gas, etc., is present.

This motor is built in either polyphase or single-phase design with a totally-enclosed frame, or a totally-



Totally inclosed fan-cooled motor.

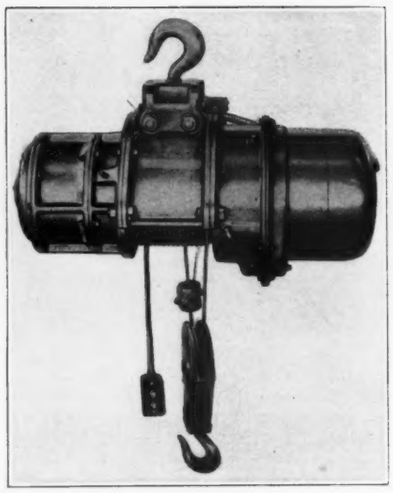
enclosed, fan-cooled frame. The motor illustrated shows the latter type.

The polyphase motors are of squirrel-cage construction with extra-heavy castings, bolts and parts. All machined parts have large fitting surfaces to correspond with the Underwriters' Laboratory requirements for this class of service.

The single-phase motors are of squirrel-cage construction, similar to the polyphase motors. These motors are of the condenser-starting type, each motor having a condenser starting unit placed in a separate box which must be mounted outside the hazardous area.

New Electric Hoist for Indoor or Outdoor Use

The new Wright Type W electric hoist, made by the Wright Manufacturing Co., Bridgeport, Conn., is built for installations where high-operating speeds, economical operation, and low-cost maintenance are first essentials. In order to obtain high speeds, plus efficient operation, the motors are of a liberal size and designed especially for this type of hoist. Low-cost maintenance is obtained by correct design, extremely simple construction, and the use of the highest grades of materials such as alloy-steel shafts, drop-forged,



Electric hoist with integral enclosed motor.

heat-treated gears and pinions, and Tru-Lay preformed cable.

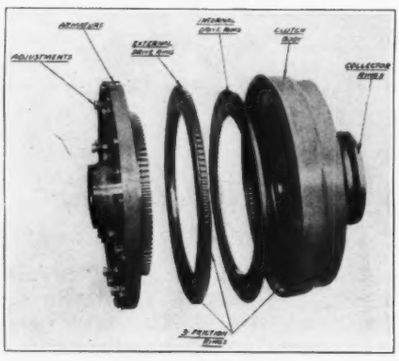
The hoists are designed for different types of suspensions. They are furnished with either push-button or pendant-rope control at the same price.

The motors and controls are fully enclosed — dust-proof and weather-proof so that the hoists are suited for both indoor and outdoor installations.

Multiple-Disk Magnetic Clutch for Heavy Duty

Cumbersome bulk, high cost and difficulty of alignment, have usually prohibited the use of magnetic clutches in large sizes. The Magnetic Manufacturing Co., Milwaukee, manufacturer of Stearns magnetic equipment, has developed and perfected a multiple-disk magnetic clutch, which eliminates all the difficulties previously inherent in the large-size clutches. It provides maximum horsepower, greater pull-out-torque, and the usual advantages of smaller magnetic clutches by way of ease of operation, smooth acceleration, and low maintenance cost. The installation cost is also appreciably less than that of the usual large clutches.

A typical clutch is illustrated here in open section. With a 24-in. diameter, over 6,500-ft. lb. pull-out torque can be developed; ample friction lining being provided for low pressure and



Multiple-disk magnetic clutch

resulting long life. The pressure per square inch is very low and the clutch provides desired greater slippage than the ordinary clutch of similar specifications.

Develops New Portable Self-Propelling Plant

The Wisconsin Foundry & Machine Co., of Madison, Wis., has developed a portable crushing and screening plant that can be moved from job to job under its own power. The whole unit is mounted on a heavy I-beam frame truck supported by six rubber-tired roller-bearing wheels. The traction for propelling the plant is obtained through four rear-drive wheels.

Operators using the portable plant are able to begin work immediately upon arrival at the pit with the shovels and to start moving as soon as the last yard of material is delivered to the trucks.

The control of the complete unit is accomplished by one man in the driver's seat. From this position the operator can move the plant forward or control the loading, crushing, reduction, and discharge of the final product into waiting trucks to haul the gravel on the road.

A single 75-hp. engine furnishes the power to operate and propel the complete plant.

New Corporations

MO-ROC-ASPHALT CO., Kansas City, Mo. $100,000. T. S. Blakesley, Lathrop Bldg.; I. J. McColman.

MONITOR PHOSPHATE CO., Seattle, Wash. $5,000. F. T. Hunter and Pierce Lonergran. To mine phosphate rock.

ALABAMA ASPHALTIC LIMESTONE CO., Birmingham, Ala. $2,000. Evans Dunn, pres.; G. W. Patterson, v.-pres.; L. Luckett, sec.

METROPOLITAN CRUSHED STONE CO., Boston, Mass. $50,000. Allan S. Farwell, pres.; Joseph Weeks, 89 Broad St., tr.; Garrett H. Keefer, Jr.

MORAINE GRAVEL & SAND CO., Dayton, Ohio. 250 sh. n.p.v. E. B. Raymond and Thomas H. Ford. Clifton Pike, mgr.

Universal Atlas Chorus Sings at Modjeski Fête

The Universal Atlas Cement Co. chorus of seventy voices sang several numbers at the reception given by the Western Society of Engineers in the Red Lacquer room, Palmer House, Chicago, February 25. The meeting was held in honor of Ralph Modjeski, consulting engineer, who received the Washington award for 1931. The Universal Atlas chorus is directed by Harry S. Walsh, and is composed of members of the organization in the Chicago office of the cement company.

Manufacturers' Publications

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when writing.*

Air Compressors

National Type WN Air Compressors. 16 p., 14 ill. (Pub. No. 870. National Brake & Electric Co., Milwaukee, Wis.) Describes and illustrates compound portable air compressors driven by gasoline engines ranging from 110 to 320 cu. ft. displacement.

Crushers

Telsmith Cone Crusher. 12 p., 9 ill. (Bulletin No. 263. Smith Engineering Works, Milwaukee, Wis.) Describes and illustrates a new spring-suspended crusher, employing a gyratory, conical head to effect reduction. Detail views and specifications are listed.

Dump Wagons

Streich Dump Wagons and Trailers. 12 p., 12 ill. (Catalogue T31. A Streich & Bro. Co., Oshkosh, Wis.) Describes and illustrates a line of dump wagons and trailers giving condensed specifications of each.

Excavators

The 75-B Bucyrus-Erie. 16 p. Illustrated. (Bucyrus-Erie Co., South Milwaukee, Wis.) A new bulletin which describes and illustrates an electric shovel and drag-line of 2½-cu. yd. maximum bucket capacity.

Locomotives, Gasoline

Mid-West Announces Model GSD. 6 p., 3 ill. (Mid-West Locomotive Wks., Hamilton, O.) Describes and illustrates a new 25-ton gasoline industrial locomotive. Specifications include: Climax 8-cylinder engine, eight speeds, drawbar pull to 12,500 lb., and Timken bearings throughout.

Materials Handling

Euclid Earth-Moving Equipment. 6 p., 9 ill. (The Euclid Crane & Hoist Co., Euclid, O.) Describes and illustrates a line of material-handling equipment, including rotary scrapers, crawler-mounted dump wagons, and automatic wheel scrapers.

Pumps, Dredge

Morris Heavy-Duty Lined Dredging Pumps. 12 p., 22 ill. (Bulletin 136. Morris Machine Wks., Baldwinsville, N. Y.) Describes and illustrates a series of centrifugal dredge pumps of from 6-in. to 15-in. discharge diameters with renewable shell liners.

Recording Instruments

Meriam-Made Instruments. (The Meriam Co., Cleveland, O.) A loose-leaf catalogue describing and illustrating indicating flow meters, manometers, draft gauges and other recording instruments for use in the plant.

Shop Equipment

Black & Decker Electric Tools. 42 p. Illustrated. (Catalogue No. 21. The Black & Decker Mfg. Co., Towson, Ind.) Describes and illustrates portable and stationary electric cutting tools for the plant repair shop.

Shovels, Electric

"The Quarry Under Signal Mountain." 2 p., 5 ill. (*The Ground-hog* for Jan.-Feb., 1931. The Marion Steam Shovel Co., Marion, O.) Describes and illustrates the use of electric shovels in the underground limestone mine of the Signal Mountain Portland Cement Co., Chattanooga, Tenn.

Tractors

Allis-Chalmers Monarch "35." 28 p., 37 ill. (Allis-Chalmers Manufacturing Co., Springfield, Ill.) Describes and illustrates a track-type tractor with maximum capacity of 40 hp. at the drawbar. Close-up views explain the construction of the various parts and assemblies. A similar catalogue describes the 50-hp. machine made by the same concern.

The New Linn Tractor. 4 p., 11 ill. (Linn Manufacturing Corp., Morris, N. Y.) Describes and illustrates a crawler-mounted tractor equipped with an elevating dump body, particularly suitable for transporting raw material from the pit or quarry to the crushing and screening plant.

Truck Bodies

Alcoa Aluminum for Truck Bodies. 88 p. Illustrated. (Aluminum Company of America, Pittsburgh, Pa.) Describes and illustrates the advantages of aluminum bodies for motor trucks. Includes photographs of stone, and sand-and-gravel trucks. Much of the text concerns the design and manufacture of such bodies.

Trucks, Motor

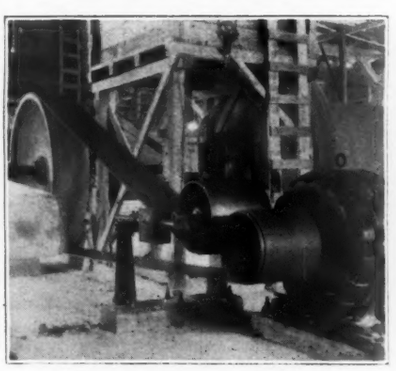
Back of the Mack. 20 p. Illustrated. (Catalogue No. 2. Mack Trucks, Inc., New York, N. Y.) Describes and illustrates the story of the building of Mack trucks and pictures the variety of models in industrial use. Tractors, trailers and switching locomotives are included also.

Contactors Permit Belt Drives to be Shortened

The accompanying illustrations are of belt drives in the plant of a prominent producer of silica. In the view which shows a single drive the belt pulleys have a center distance of 16 ft. This same drive originally had 31-ft. centers and the shortening was effected by the installation of the contactor shown. Not only does this new arrangement save in space and belting, but it has eliminated all belt slippage with its attendant loss of power and wear of belting.

The other view shows three belt drives. Each of the drives on the left and on the right now has 9-ft. centers, this distance having been materially reduced, from the former distances, through the placement of contactors.

In this same plant are five other contactors, each working on an 18-in. belt. Each motor pulley has 20-in. diameter and each driven pulley, 78-in. diameter.



Contactor permitted this drive to be shortened fifteen feet.

End view of three belt drives with contactors.

These contactors were furnished by the T. B. Wood's Sons Co., Chambersburg, Pa., manufacturer of power-transmission machinery.

The same type of equipment has been employed in the plant of the Union Mining Co., Mount Savage, Md., for several years. The belt drive with a Wood contactor was installed to replace two heavy chain-drives. One 200-hp electric motor superseded two 100-hp. motors. This company wrote: "When the two motors were running it seemed as though we had a heavy overload, but, since installing the one 200-hp. motor with the belt contactor, we find we are running with only about 60 per cent of the load of the motor. The drive is giving wonderfully good service."

Investigations on Cement, Aggregates, Gypsum Reported by A. S. T. M.

IN its review of activities during 1930 the American Society for Testing Materials includes the following reports of interest to operators of cement, gypsum, concrete, and aggregates plants:

Portland Cement

"Committee C-1 on cement has been very active during the past year and has approved a revision of the standard specifications for Portland cement involving an increase in the minimum tensile-strength requirements for standard mortar briquets. The committee believed these increased requirements justifiable on the basis of the general strength level now maintained by the American Portland cements. The committee also prepared new specifications for high-early-strength Portland cement which differ from the requirements for the standard Portland cement only in requiring a higher strength at early ages and in permitting a greater amount of sulphuric anhydride.

"The committee has prepared a set of tolerances concerning new and used cement-testing apparatus which had been inserted in the test procedure.

"The activities of the cement-testing laboratory established by the A. S. T. M. through Committee C-1 at the Bureau of Standards have resulted in the preparation of plans for carrying out the work; in securing and training of an experienced personnel; data on apparatus, test methods and conditions in many laboratories; reports of laboratory investigations; elimination of some variations in test methods; and the improvement of condition of numerous pieces of apparatus and the accumulation of much information for compilation and study.

"A sub-committee on strength has given further thought to the development of a new acceptance test for cements and has continued its investigations on plastic-mortar compression specimens.

"Information supplied by manufacturers on the characteristics of masonry cements has been assembled by the sub-committee on masonry cement. The wide variation in the character of this type of cement and in the properties reported for it are cogent arguments why there should be a standard for this commodity. The cement committee has recently been reorganized, and studies on masonry and plastic cements, the use of which is growing so rapidly, are now under way looking toward the development of a specification within the year.

"Studies on the rate of hydration of cement clinker have been continued by F. O. Anderegg and D. S. Hubbell, and reported in a paper entitled 'The Rate of Hydration of Cement Clinker. Part II, Portland Cement at Nine and Twelve Months; Part III, Three Minerals Found in Portland Cement.' Two other papers of interest in this connection were those by J. R. Dwyer and P. H. Bates, 'The Relation Between the Strengths of Cements Developed by Mortar Specimens and Concrete Specimens,' and, by C. H. Scholer and L. H. Koenitzer, 'A Study of Fourteen Brands of Standard Portland Cements and Four Early-Strength Cements.'

Gypsum

"Committee C-11 on gypsum has completed one of its most active years. The committee developed new specifications for gypsum sheathing board which were issued as tentative, and approved the advancement to standard of the tentative specifications for Keene's cement and calcined gypsum for dental plasters. Revisions were also made in the methods of testing gypsum and gypsum products and in several specifications for gypsum and gypsum plasters.

"Sub-committee I on Gypsum for Various Uses, in addition to continuing its work on the uses of gypsum and anhydrite as a retarder for Portland cement, is endeavoring to correlate the work being done by different investigators throughout the world on gypsum and anhydrite.

"The standard method of determining normal consistency of neat calcined gypsum is by means of the modified Vicat apparatus. Sub-committee II on Gypsum Plasters is endeavoring to apply this instrument to wood-fiber plaster and ready-sanded plaster by increasing the weight of the plunger. From the results of tests so far conducted by different investigations, it is felt that the modified Vicat apparatus has possibilities in determining standard consistency of sanded plasters, but the results of tests on wood-fiber plasters are inconsistent and there is doubt as to the suitability of this instrument for this product.

"Investigations are being made to determine if the use of a positive accelerator of constant composition used without sand in the determination of time of set of gypsum neat plaster is to be preferred to the present standard method.

"The committee also reported the results of a comprehensive investigation of gypsum-fiber concrete undertaken to obtain information and data on which building code requirements might be based.

Concrete and Aggregates

"Committee C-9 on Concrete and Concrete Aggregates has under consideration approximately 100 independent projects, the work of which is divided among 60 members, grouped into 15 technical and 3 administrative sub-committees. Progress reports on many of the projects appear in the current report of the committee.

"Specifications and methods of test of aggregates have received a large share of the committee's attention. The tentative specifications for concrete aggregates have been revised and a new laboratory method of making flexure tests of concrete using a simple beam with center loading was developed.

"The Sub-committee on Unification of Specifications is assembling a general specification for concrete, intended to include only the framework necessary to write the specifications for materials and methods which have been, or will be, prepared by Committee C-9.

"The Sub-committee on Design of Concrete has paid particular attention to a method for design of concrete based on flexural strength. Information has been collected on the effects on flexural strength of such factors as moisture content, richness of mix, age of concrete and surface of aggregate.

"The Sub-committee on Extraneous Substances in Concrete is paying particular attention to the development of information on the effects of substances contributing to lack of durability of concrete. Information has been collected thus far on effect of coal and lignite, flat and elongated particles and oil-bearing aggregates.

"Special attention has been paid to the development of methods for determining the constituents of fresh concrete by the sub-committee on materials, mixing and placing concrete. Methods proposed by various investigators have been studied and reviewed and a report describing the various methods is expected to be available within the year. A method for analyzing hardened concrete is also under consideration.

"Committee C-9 has given consideration to the problems connected with the production and transportation of ready-mixed concrete and has organized a new sub-committee to study these problems.

"The sub-committee on workability of concrete has made a number of studies of various methods of determining the workability of concrete. These important studies are being continued.

"W. F. Purrington and H. C. Loring have continued their investigations on workability by measuring the power consumed in mixing, and a report of their studies appears in a paper entitled 'Further Studies on the Workability of Concrete.'

"Committee C-9 is giving careful consideration to means of preventing overlapping and duplicating efforts of various organizations interested in concrete and concrete aggregates. Steps are being taken in an endeavor to arrange for a better correlation of the activities of the several committees interested in the same field."

Announcing—

C. W. HUNT CO.

DIVISION OF

GIFFORD-WOOD CO.

IT is with pleasure that Gifford-Wood Co. of Hudson, N. Y., announces its acquisition of the C. W. Hunt Co. of Staten Island, N. Y., which will henceforth be operated as a division of Gifford-Wood Co.

▲ ▲ ▲

C. W. Hunt Company for over 50 years has served the needs of public utilities, railroads and branches of these industries, which it has supplied with its skip hoists, vibrating screens, industrial railroads, pivoted bucket conveyors, and other related equipment.

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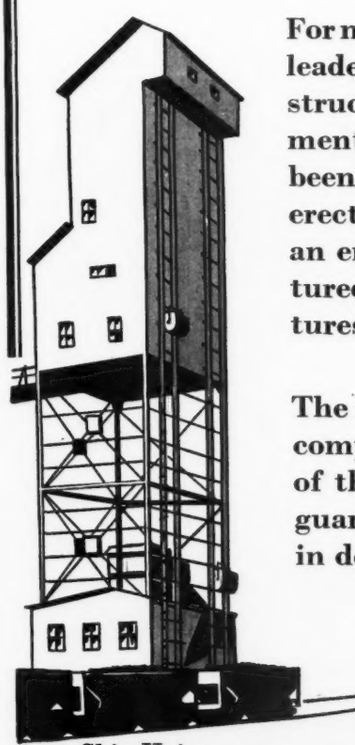


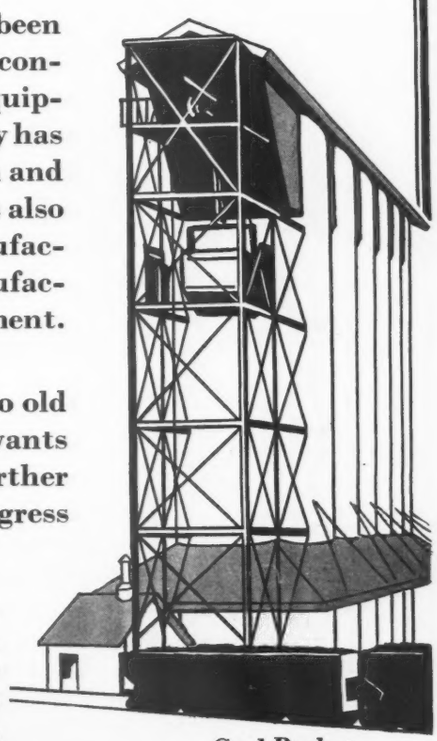
Skip Hoist

For many years Gifford-Wood Co. has been leader in designing, engineering and constructing elevating and handling equipment for the coal industry. Its activity has been particularly centered on design and erection of retail coal pockets. It has also an enviable reputation in the manufactured ice industry for which it manufactures conveying and elevating equipment.

▲ ▲ ▲

The merging of interests of these two old companies, long experienced in the wants of the industries they serve, is a further guarantee to those industries of progress in design and speed in fulfillment.

Communications to either should be directed to headquarters at Hudson, N. Y., or the branch offices, Graybar Building, New York City, and 565 W. Washington Street, Chicago, Ill.



Coal Pocket

GIFFORD-WOOD CO.

C. W. HUNT CO. *Division*

HUDSON, N. Y.